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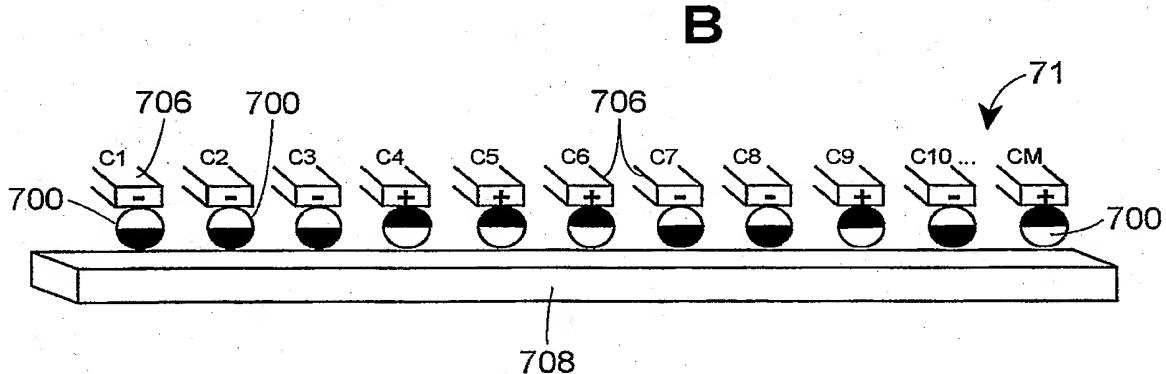
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(54) Title: ELECTRONIC INSERTS FOR A GAMING APPARATUS



(57) Abstract: A method and apparatus for electronically controlling gaming machines such as poker, blackjack, slots, keno, and/or bingo. Customer information such as denomination input, maximum coin input, maximum number of coins won, pay tables, pay lines, and the like may be changed electronically with an electronic ink display. The gaming machine may be updated electronically without shutting the game down and losing income or incurring additional costs from manually replacing - static display inserts on the machine.

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ELECTRONIC INSERTS FOR A GAMING APPARATUSBACKGROUND

[0001] The present invention is directed to novel gaming devices and, more particularly, to gaming devices having the capability of electronically changing their displays.

[0002] Prior art gaming devices typically include displays with static information that may provide a player with directions and other information for that particular game. Information is printed on a front display glass having static inserts that provide information such as denomination input, award and bonus potential, button legends, and reel strips.

[0003] Gaming devices with static inserts are known, for example U.S. Patent No. 6,663,488 to Adams et al. discloses gaming devices comprising a standard gaming unit, e.g. three reels, and a discernable additional payout indicator in a rotatable wheel. Another patent, U.S. Patent No. 6,659,864 to McCann et al. discloses a gaming device which awards an initial award to a player, discloses to a player that the higher valued enticement award is available and selectable, and enables a player to selectively swap the initial award for an opportunity to select the enticement award. The game masks the enticement award in a pattern of one or more masked consolation awards, the consolation awards having values less than the value of the initial award.

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SUMMARY OF THE INVENTION

[0004] In one aspect, the invention is directed to a gaming apparatus including a housing with a display unit disposed on the housing. The display unit may be adapted to variably display denomination input, maximum coin input, maximum coin jackpot, pay tables, paylines, and predetermined customer advertisements. At least one electronic insert may be operationally coupled to the display unit. The electronic inserts may include a plurality of electronic ink elements with permanently charged particles suspended in a clear fluid. The charged particles may be formed in first and second types. The first type of particle may have a first color and have a positive charge. The second type of particle may have a second color and a negative charge. The gaming apparatus further includes a value input device for receiving money and the like. A controller may be operatively coupled to the display unit and to the value input device. The controller may have a processor and a memory operatively coupled to the processor. The controller may be programmed to cause the display unit to generate a game of chance such as poker,

blackjack, slots, keno, and bingo. The controller may be programmed to selectively change information displayed by the electronic inserts while the apparatus remains operational, and to determine the value payout associated with an outcome of the game.

[0005] In another aspect, the invention is directed a display that may have at least

5 one electronic insert. Each electronic insert may include a plurality of electronic ink elements. The elements may have two types of permanently charged particles suspended in a clear fluid. The first type of particles may have a first color and a positive charge.

The second type of particles may have a second color and a negative charge. The

electronic ink elements may be adapted to display denomination input, maximum coin

10 input, maximum coin jackpot, pay tables, paylines, and predetermined advertising information. A value input device may be provided to receive currency and the like. A controller may be operatively coupled to the display unit and the value input device. The controller may include a processor with a memory that is operatively coupled to the processor. The controller may be programmed to receive data representing a payline

15 selection made by a player. The controller may be programmed to cause a game display to be generated by the display unit. The game display may include images of a plurality of slot machine symbols each of which may be associated with a respective slot machine reel. The controller may be programmed to selectively update the electronic display inserts while the gaming apparatus remains operational. The controller may be

20 programmed to determine a value payout associated with an outcome of the slots game. The controller may be programmed to determine the outcome of the slots game based on a configuration of the slot machine symbols.

[0006] In another aspect, the invention is directed to a gaming method for displaying of one of the following games: poker, blackjack, slots, keno or bingo 25 with an electronic display having at least one electronic insert. Each electronic insert may include a plurality of electronic ink elements with two types of permanently charged particles suspended in a clear fluid. The first type of particles may have a first color and a positive charge. The second type of particles may have a second color and a negative charge. A value payout associated with an outcome of the game represented by the video image may be determined. The method may 30 electronically change information displayed by the display inserts while the game remains operational.

[0007] In another aspect, the invention is directed to a method of controlling an electronic display on a gaming machine by supplying electrical power to a controller that

may control the display unit. The display unit may have at least one electronic insert with a plurality of electronic ink elements. Each electronic element may include two types of permanently charged particles suspended in a clear fluid. The first type of particles may have a first color and a positive charge. The second type of particles may 5 have a second color and a negative charge. Information may be downloaded to the electronic display. The controller may retrieve the download information for the display and send the information to the display. The controller may start a write timer to determine a refresh time for the display. The controller may determine whether the write timer has timed out. The controller may refresh the display after the timer has timed out.

10 The controller may enter a power save mode for a predetermined period of time and then refresh the display after the predetermined period of time has elapsed.

[0008] In another aspect, the invention is directed to a gaming apparatus including a housing with a display unit disposed on the housing. The display unit may be adapted to variably display denomination input, maximum coin input, maximum coin jackpot, pay 15 tables, paylines, and predetermined customer advertisements. At least one electronic insert may be operationally coupled to the display unit. The electronic insert may include a bi-stable image, wherein the display retains the image without electrical power or backlighting. The gaming apparatus further includes a value input device for receiving money and the like. A controller may be operatively coupled to the display unit and to the 20 value input device. The controller may have a processor and a memory operatively coupled to the processor. The controller may be programmed to cause the display unit to generate a game of chance such as poker, blackjack, slots, keno, and bingo. The controller may be programmed to selectively change information displayed by the electronic inserts while the apparatus remains operational, and to determine the value payout associated 25 with an outcome of the game.

[0009] Additional aspects of the invention are defined by the claims of this patent.

#### Brief Description of the Drawings

[0010] Fig. 1 is a block diagram of an embodiment of a gaming system in 30 accordance with the invention;

[0011] Fig. 2 is a perspective view of an embodiment of one of the gaming units shown schematically in Fig. 1;

[0012] Fig. 2A illustrates an embodiment of a control panel for a gaming unit;

[0013] Fig. 3 is a block diagram of the electronic components of the gaming unit

of Fig. 2;

[0014] Fig. 4 is a flowchart of an embodiment of a main routine that may be performed during operation of one or more of the gaming units;

[0015] Fig. 5 is a flowchart of an alternative embodiment of a main routine that may be performed during operation of one or more of the gaming units;

[0016] Fig. 6 is an illustration of an embodiment of a visual display that may be displayed during performance of the video poker routine of Fig. 8;

[0017] Fig. 7 is an illustration of an embodiment of a visual display that may be displayed during performance of the video blackjack routine of Fig. 9;

10 [0018] Fig. 8 is a flowchart of an embodiment of a video poker routine that may be performed by one or more of the gaming units;

[0019] Fig. 9 is a flowchart of an embodiment of a video blackjack routine that may be performed by one or more of the gaming units;

15 [0020] Fig. 10 is an illustration of an embodiment of a visual display that may be displayed during performance of the slots routine of Fig. 12;

[0021] Fig. 11 is an illustration of an embodiment of a visual display that may be displayed during performance of the video keno routine of Fig. 13;

[0022] Fig. 12 is a flowchart of an embodiment of a slots routine that may be performed by one or more of the gaming units;

20 [0023] Fig. 13 is a flowchart of an embodiment of a video keno routine that may be performed by one or more of the gaming units;

[0024] Fig. 14 is an illustration of an embodiment of a visual display that may be displayed during performance of the video bingo routine of Fig. 15;

25 [0025] Fig. 15 is a flowchart of an embodiment of a video bingo routine that may be performed by one or more of the gaming units;

[0026] Fig. 16A is a schematic illustrating a partial electronic display having electronic ink elements with randomly positioned charged particles;

[0027] Fig. 16B is a schematic illustrating the electronic display of Fig. 16A, after an electric field has been applied to the electronic ink elements;

30 [0028] Fig. 17 is a display area for a gaming apparatus illustrating a plurality of electronic display inserts; and

[0029] Fig. 18 is a flowchart for a gaming machine having an electronic ink display.

Detailed Description of Various Embodiments

[0030] Although the following text sets forth a detailed description of numerous different embodiments of the invention, it should be understood that the legal scope of the invention is defined by the words of the claims set forth at the end of this patent. The 5 detailed description is to be construed as exemplary only and does not describe every possible embodiment of the invention since describing every possible embodiment would be impractical, if not impossible. Numerous alternative embodiments could be implemented, using either current technology or technology developed after the filing date of this patent, which would still fall within the scope of the claims defining the invention.

10 [0031] It should also be understood that, unless a term is expressly defined in this patent using the sentence "As used herein, the term ' \_\_\_\_\_ ' is hereby defined to mean..." or a similar sentence, there is no intent to limit the meaning of that term, either expressly or by implication, beyond its plain or ordinary meaning, and such term should not be interpreted to be limited in scope based on any statement made in any section of 15 this patent (other than the language of the claims). To the extent that any term recited in the claims at the end of this patent is referred to in this patent in a manner consistent with a single meaning, that is done for sake of clarity only so as to not confuse the reader, and it is not intended that such claim term be limited, by implication or otherwise, to that single meaning. Finally, unless a claim element is defined by 20 reciting the word "means" and a function without the recital of any structure, it is not intended that the scope of any claim element be interpreted based on the application of 35 U.S.C. §112, sixth paragraph.

[0032] Fig. 1 illustrates one possible embodiment of a casino gaming system 10 in accordance with the invention. Referring to Fig. 1, the casino gaming system 25 10 may include a first group or network 12 of casino gaming units 20 operatively coupled to a network computer 22 via a network data link or bus 24. The casino gaming system 10 may include a second group or network 26 of casino gaming units 30 operatively coupled to a network computer 32 via a network data link or bus 34. The first and second gaming networks 12, 26 may be operatively coupled to each other via a 30 network 40, which may comprise, for example, the Internet, a wide area network (WAN), or a local area network (LAN) via a first network link 42 and a second network link 44.

[0033] The first network 12 of gaming units 20 may be provided in a first casino, and the second network 26 of gaming units 30 may be provided in a second casino located in a

separate geographic location than the first casino. For example, the two casinos may be located in different areas of the same city, or they may be located in different states. The network 40 may include a plurality of network computers or server computers (not shown), each of which may be operatively interconnected. Where the network 40 5 comprises the Internet, data communication may take place over the communication links 42, 44 via an Internet communication protocol.

[0034] The network computer 22 may be a server computer and may be used to accumulate and analyze data relating to the operation of the gaming units 20. For example, the network computer 22 may continuously receive data from each of the 10 gaming units 20 indicative of the dollar amount and number of wagers being made on each of the gaming units 20, data indicative of how much each of the gaming units 20 is paying out in winnings, data regarding the identity and gaming habits of players playing each of the gaming units 20, etc. The network computer 32 may be a server computer and may be used to perform the same or different functions in relation to the gaming units 30 15 as the network computer 22 described above.

[0035] Although each network 12, 26 is shown to include one network computer 22, 32 and four gaming units 20, 30, it should be understood that different numbers of computers and gaming units may be utilized. For example, the network 12 may include a plurality of network computers 22 and tens or hundreds of gaming units 20, all of which 20 may be interconnected via the data link 24. The data link 24 may be provided as a dedicated hardwired link or a wireless link. Although the data link 24 is shown as a single data link 24, the data link 24 may comprise multiple data links.

[0036] Fig. 2 is a perspective view of one possible embodiment of one or more of the gaming units 20. Although the following description addresses the design of the 25 gaming units 20, it should be understood that the gaming units 30 may have the same design as the gaming units 20 described below. It should be understood that the design of one or more of the gaming units 20 may be different than the design of other gaming units 20, and that the design of one or more of the gaming units 30 may be different than the design of other gaming units 30. Each gaming unit 20 may be any type of casino 30 gaming unit and may have various different structures and methods of operation. For exemplary purposes, various designs of the gaming units 20 are described below, but it should be understood that numerous other designs may be utilized.

[0037] Referring to Fig. 2, the casino gaming unit 20 may include a housing or cabinet 50 and one or more input devices, which may include a1 coin slot or acceptor 52, a

paper currency acceptor 54, a ticket reader/printer 56 and a card reader 58, which may be used to input value to the gaming unit 20. A value input device may include any device that can accept value from a customer. As used herein, the term "value" may encompass gaming tokens, coins, paper currency, ticket vouchers, credit or debit cards, smart cards, 5 and any other object representative of value.

[0038] If provided on the gaming unit 20, the ticket reader/printer 56 may be used to read and/or print or otherwise encode ticket vouchers 60. The ticket vouchers 60 may be composed of paper or another printable or encodable material and may have one or more of the following informational items printed or encoded thereon: the casino name, the type 10 of ticket voucher, a validation number, a bar code with control and/or security data, the date and time of issuance of the ticket voucher, redemption instructions and restrictions, a description of an award, and any other information that may be necessary or desirable. Different types of ticket vouchers 60 could be used, such as bonus ticket vouchers, cash-redemption ticket vouchers, casino chip ticket vouchers, extra game play ticket 15 vouchers, merchandise ticket vouchers, restaurant ticket vouchers, show ticket vouchers, etc. The ticket vouchers 60 could be printed with an optically readable material such as ink, or data on the ticket vouchers 60 could be magnetically encoded. The ticket reader/printer 56 may be provided with the ability to both read and print ticket vouchers 60, or it may be provided with the ability to only read or only print or encode ticket 20 vouchers 60. In the latter case, for example, some of the gaming units 20 may have ticket printers 56 that may be used to print ticket vouchers 60, which could then be used by a player in other gaming units 20 that have ticket readers 56.

[0039] If provided, the card reader 58 may include any type of card reading device, such as a magnetic card reader or an optical card reader, and may be used to 25 read data from a card offered by a player, such as a credit card or a player tracking card. If provided for player tracking purposes, the card reader 58 may be used to read data from, and/or write data to, player tracking cards that are capable of storing data representing the identity of a player, the identity of a casino, the player's gaming habits, etc.

[0040] The gaming unit 20 may include one or more audio speakers 62, a coin payout 30 tray 64, an input control panel 66, and a display unit 70. Where the gaming unit 20 is designed to facilitate play of a video casino game, such as video poker or video slots, the display unit 70 may be a color video display unit that displays images relating to the particular game or games. Where the gaming unit 20 is designed to facilitate play of a

reel-type slot machine, the display unit 70 may comprise a plurality of mechanical reels that are rotatable, with each of the reels having a plurality of reel images disposed thereon. The audio speakers 62 may generate audio representing sounds such as the noise of spinning slot machine reels, a dealer's voice, music, announcements or any other audio related to a casino game. The input control panel 66 may be provided with a plurality of pushbuttons or touch-sensitive areas that may be pressed by a player to select games, make wagers, make gaming decisions, etc. The gaming unit 20 may also include electronic display inserts 71. The electronic inserts 71 may use electronic ink elements to display text and graphics. Electronic inserts with electronic ink elements will be described more fully below.

[0041] Fig. 2A illustrates one possible embodiment of the control panel 66, which may be used where the gaming unit 20 is a slot machine having a plurality of mechanical or "virtual" reels. Referring to Fig. 2A, if the display unit 70 is provided in the form of a video display unit, the control panel 66 may include a "See Pays" button 72 that, when activated, causes the display unit 70 to generate one or more display screens showing the odds or payout information for the game or games provided by the gaming unit 20. As used herein, the term "button" is intended to encompass any device that allows a player to make an input, such as an input device that must be depressed to make an input selection or a display area that a player may simply touch. The control panel 66 may include a "Cash Out" button 74 that may be activated when a player decides to terminate play on the gaming unit 20, in which case the gaming unit 20 may return value to the player, such as by returning a number of coins to the player via the payout tray 64.

[0042] If the gaming unit 20 provides a slots game having a plurality of reels and a plurality of paylines which define winning combinations of reel symbols, the control panel 66 may be provided with a plurality of selection buttons 76, each of which allows the player to select a different number of paylines prior to spinning the reels. For example, five buttons 76 may be provided, each of which may allow a player to select one, three, five, seven or nine paylines.

[0043] If the gaming unit 20 provides a slots game having a plurality of reels, the control panel 66 may be provided with a plurality of selection buttons 78 each of which allows a player to specify a wager amount for each payline selected. For example, if the smallest wager accepted by the gaming unit 20 is a quarter (\$0.25), the gaming unit 20 may be provided with five selection buttons 78, each of which may allow a player to select one,

two, three, four or five quarters to wager for each payline selected. In that case, if a player were to activate the "5" button 76 (meaning that five paylines were to be played on the next spin of the reels) and then activate the "3" button 78 (meaning that three coins per payline were to be wagered), the total wager would be \$3.75 (assuming the minimum bet was \$0.25).

5 [0044] The control panel 66 may include a "Max Bet" button 80 to allow a player to make the maximum wager allowable for a game. In the above example, where up to nine paylines were provided and up to five quarters could be wagered for each payline selected, the maximum wager would be 45 quarters, or \$11.25. The control panel 66 may 10 include a spin button 82 to allow the player to initiate spinning of the reels of a slots game after a wager has been made.

10 [0045] In Fig. 2A, a rectangle is shown around the buttons 72, 74, 76, 78, 80, 82. It should be understood that that rectangle simply designates, for ease of reference, an area in which the buttons 72, 74, 76, 78, 80, 82 may be located. Consequently, the term 15 "control panel" should not be construed to imply that a panel or plate separate from the housing 50 of the gaming unit 20 is required, and the term "control panel" may encompass a plurality or grouping of player activatable buttons.

15 [0046] Although one possible control panel 66 is described above, it should be understood that different buttons could be utilized in the control panel 66, and that the 20 particular buttons used may depend on the game or games that could be played on the gaming unit 20. If the display unit 70 is provided as a video display unit, the control panel 66 could be generated by the display unit 70. In that case, each of the buttons of the control panel 66 could be a colored area generated by the display unit 70, and some type of mechanism may be associated with the display unit 70 to detect when each 25 of the buttons was touched, such as a touch-sensitive screen.

#### Gaming Unit Electronics

30 [0047] Fig. 3 is a block diagram of a number of components that may be incorporated in the gaming unit 20. Referring to Fig. 3, the gaming unit 20 may include a controller 100 that may comprise a program memory 102, a microcontroller or microprocessor (MP) 104, a random-access memory (RAM) 106 and an input/output (I/O) circuit 108, all of which may be interconnected via an address/data bus 110. It should be appreciated that although only one microprocessor 104 is shown, the controller 100 may include multiple microprocessors 104. Similarly, the memory of the controller 100 may include multiple RAMs 106 and multiple program memories 102. Although the I/O circuit 108 is shown

as a single block, it should be appreciated that the I/O circuit 108 may include a number of different types of I/O circuits. The RAM(s) 104 and program memories 102 may be implemented as semiconductor memories, magnetically readable memories, and/or optically readable memories, for example.

5 [0048] Although the program memory 102 is shown in Fig. 3 as a read-only memory (ROM) 102, the program memory of the controller 100 may be a read/write or alterable memory, such as a hard disk. In the event a hard disk is used as a program memory, the address/data bus 110 shown schematically in Fig. 3 may comprise multiple address/data buses, which may be of different types, and there may be an I/O circuit disposed between 10 the address/data buses.

15 [0049] Fig. 3 illustrates that the control panel 66, the coin acceptor 52, the bill acceptor 54, the card reader 58, the ticket reader/printer 56, the display 70, and the electronic inserts 71 may be operatively coupled to the I/O circuit 108, each of those components being so coupled by either a unidirectional or bidirectional, single-line or multiple-line data link, which may depend on the design of the component that is used. The speaker(s) 62 may be operatively coupled to a sound circuit 112, that may comprise a voice- and sound-synthesis circuit or that may comprise a driver circuit. The sound-generating circuit 112 may be coupled to the I/O circuit 108.

20 [0050] As shown in Fig. 3, the components 52, 54, 56, 58, 66, 112 may be connected to the I/O circuit 108 via a respective direct line or conductor. Different connection schemes could be used. For example, one or more of the components shown in Fig. 3 may be connected to the I/O circuit 108 via a common bus or other data link that is shared by a number of components. Furthermore, some of the components may be directly connected to the microprocessor 104 without passing through the I/O 25 circuit 108.

#### Overall Operation of Gaming Unit

30 [0051] One manner in which one or more of the gaming units 20 (and one or more of the gaming units 30) may operate is described below in connection with a number of flowcharts which represent a number of portions or routines of one or more I computer programs, which may be stored in one or more of the memories of the controller 100. The computer program(s) or portions thereof may be stored remotely, outside of the gaming unit 20, and may control the operation of the gaming unit 20 from a remote location. Such remote control may be facilitated with the use of a wireless connection, or by an Internet interface that connects the gaming unit 20 with a remote

computer (such as one of the network computers 22, 32) having a memory in which the computer program portions are stored. The computer program portions may be written in any high level language such as C, C++, C#, Java or the like or any low-level assembly or machine language. By storing the computer program portions therein, various portions of the memories 102, 106 are physically and/or structurally configured in accordance with computer program instructions.

[0052] Fig. 4 is a flowchart of a main operating routine 200 that may be stored in the memory of the controller 100. Referring to Fig. 4, the main routine 200 may begin operation at block 202 during which an attraction sequence may be performed in an attempt to induce a potential player in a casino to play the gaming unit 20. The attraction sequence may be performed by displaying one or more video images on the display unit 70 (if provided as a video display unit) and/or causing one or more sound segments, such as voice or music, to be generated via the speakers 62. The attraction sequence may include a scrolling list of games that may be played on the gaming unit 20 and/or video images of various games being played, such as video poker, video blackjack, video slots, video keno, video bingo, etc.

[0053] During performance of the attraction sequence, if a potential player makes any input to the gaming unit 20 as determined at block 204, the attraction sequence may be terminated and a game-selection display may be generated on the display unit 70 (if provided as a video display unit) at block 206 to allow the player to select a game available on the gaming unit 20. The gaming unit 20 may detect an input at block 204 in various ways. For example, the gaming unit 20 could detect if the player presses any button on the gaming unit 20; the gaming unit 20 could determine if the player deposited one or more coins into the gaming unit 20; the gaming unit 20 could determine if player deposited paper currency into the gaming unit; etc.

[0054] The game-selection display generated at block 206 may include, for example, a list of video games that may be played on the gaming unit 20 and/or a visual message to prompt the player to deposit value into the gaming unit 20. While the game-selection display is generated, the gaming unit 20 may wait for the player to make a game selection. Upon selection of one of the games by the player as determined at block 208, the controller 100 may cause one of a number of game routines to be performed to allow the selected game to be played. For example, the game routines could include a video poker routine 210, a video blackjack routine 220, a slots routine 230, a video keno routine

240, and a video bingo routine 250. At block 208, if no game selection is made within a given period of time, the operation may branch back to block 202.

[0055] After one of the routines 210, 220, 230, 240, 250 has been performed to allow the player to play one of the games, block 260 may be utilized to determine whether the 5 player wishes to terminate play on the gaming unit 20 or to select another game. If the player wishes to stop playing the gaming unit 20, which wish may be expressed, for example, by selecting a "Cash Out" button, the controller 100 may dispense value to the player at block 262 based on the outcome of the game(s) played by the player. The operation may then return to block 202. If the player did not wish to quit as determined 10 at block 260, the routine may return to block 208 where the game-selection display may again be generated to allow the player to select another game.

[0056] It should be noted that although five gaming routines are shown in Fig. 4, a different number of routines could be included to allow play of a different number of games. The gaming unit 20 may also be programmed to allow play of different games.

15 [0057] Fig. 5 is a flowchart of an alternative main operating routine 300 that may be stored in the memory of the controller 100. The main routine 300 may be utilized for gaming units 20 that are designed to allow play of only a single game or single type of game. Referring to Fig. 5, the main routine 300 may begin operation at block 302 during which an attraction sequence may be performed in an attempt to induce a 20 potential player in a casino to play the gaming unit 20. The attraction sequence may be performed by displaying one or more video images on the display unit 70 (if provided as a video display unit) and/or causing one or more sound segments, such as voice or music, to be generated via the speakers 62.

[0058] During performance of the attraction sequence, if a potential player makes 25 any input to the gaming unit 20 as determined at block 304, the attraction sequence may be terminated and a game display may be generated on the display unit 70 (if provided as a video display unit) at block 306. The game display generated at block 306 may include, for example, an image of the casino game that may be played on the gaming unit 20 and/or a visual message to prompt the player to deposit value into the gaming unit 20. At 30 block 308, the gaming unit 20 may determine if the player requested information concerning the game, in which case the requested information maybe displayed at block 310. Block 312 maybe used to determine if the player requested initiation of a game, in which case a game routine 320 may be performed. The game routine 320 could be any one of the game routines disclosed herein, such as one of the five game routines 210, 220, 230,

240, 250, or another game routine.

[0059] After the routine 320 has been performed to allow the player to play the game, block 322 may be utilized to determine whether the player wishes to terminate play on the gaming unit 20. If the player wishes to stop playing the gaming unit 20, which 5 wish may be expressed, for example, by selecting a "Cash Out" button, the controller 100 may dispense value to the player at block 324 based on the outcome of the game(s) played by the player. The operation may then return to block 302. If the player did not wish to quit as determined at block 322, the operation may return to block 308.

#### Video Poker

10 [0060] Where the gaming unit 20 is designed to facilitate play of a video poker game, the display unit 70 may comprise a video display unit. Fig. 6 is an exemplary display 350 that may be shown on the display unit 70 during performance of the video poker routine 210 shown schematically in Fig. 4. Referring to Fig. 6, the display 350 may include video images 352 of a plurality of playing cards representing the player's hand, 15 such as five cards. To allow the player to control the play of the video poker game, a plurality of player-selectable buttons may be displayed. The buttons may include a "Hold" button 354 disposed directly below each of the playing card images 352, a "Cash Out" button 356, a "See Pays" button 358, a "Bet One Credit" button 360, a "Bet Max Credits" button 362, and a "Deal/Draw" button 364. The display 350 may also include an 20 area 366 in which the number of remaining credits or value is displayed. If the display unit 70 is provided with a touch-sensitive screen, the buttons 354, 356, 358, 360, 362, 364 may form part of the video display 350. Alternatively, one or more of those buttons may be provided as part of a control panel that is provided separately from the display unit 70.

[0061] Fig. 8 is a flowchart of the video poker routine 210 shown schematically in Fig. 4. Referring to Fig. 8, at block 370, the routine may determine whether the player has requested payout information, such as by activating the "See Pays" button 358, in which case at block 372 the routine may cause one or more pay tables to be displayed on the display unit 70. At block 374, the routine may determine whether the player has made a bet, such as by pressing the "Bet One Credit" button 360, in which case at block 376 bet 30 data corresponding to the bet made by the player may be stored in the memory of the controller 100. At block 378, the routine may determine whether the player has pressed the "Bet Max Credits" button 362, in which case at block 380 bet data corresponding to the maximum allowable bet may be stored in the memory of the controller 100.

[0062] At block 382, the routine may determine if the player desires a new hand to be

dealt, which may be determined by detecting if the "Deal/Draw" button 364 was activated after a wager was made. In that case, at block 384 a video poker hand may be "dealt" by causing the display unit 70 to generate the playing card images 352. After the hand is dealt, at block 386 the routine may determine if any of the "Hold" buttons 354 have been activated by the player, in which case data regarding which of the playing card images 352 are to be "held" may be stored in the controller 100 at block 388. If the "Deal/Draw" button 364 is activated again as determined at block 390, each of the playing card images 352 that was not "held" may be caused to disappear from the video display 350 and to be replaced by a new, randomly selected, playing card image 352 at block 392.

10 [0063] At block 394, the routine may determine whether the poker hand represented by the playing card images 352 currently displayed is a winner. That determination may be made by comparing data representing the currently displayed poker hand with data representing all possible winning hands, which may be stored in the memory of the controller 100. If there is a winning hand, a payout value corresponding to the winning hand may be determined at block 396. At block 398, the player's cumulative value or number of credits may be updated by subtracting the bet made by the player and adding, if the hand was a winner, the payout value determined at block 396. The cumulative value or number of credits may also be displayed in the display area 366 (Fig. 6).

15 [0064] Although the video poker routine 210 is described above in connection with a single poker hand of five cards, the routine 210 may be modified to allow other versions of poker to be played. For example, seven card poker Play be played, or stud poker may be played. Alternatively, multiple poker hands may be simultaneously played. In that case, the game may begin by dealing a single poker hand, and the player may be allowed to hold certain cards. After deciding which cards to hold, the held cards may be duplicated in a plurality of different poker hands, with the remaining cards for each of those poker hands being randomly determined.

20 [0065] Where the gaming unit 20 is designed to facilitate play of a video blackjack game, the display unit 70 may comprise a video display unit. Fig. 7 is an exemplary display 400 that may be shown on the display unit 70 during performance of the video blackjack routine 220 shown schematically in Fig. 4. Referring to Fig. 7, the display 400 may include video images 402 of a pair of playing cards representing a dealer's hand, with one of the cards shown face up and the other card being shown face down, and video

#### Video Blackjack

30 [0065] Where the gaming unit 20 is designed to facilitate play of a video blackjack game, the display unit 70 may comprise a video display unit. Fig. 7 is an exemplary display 400 that may be shown on the display unit 70 during performance of the video blackjack routine 220 shown schematically in Fig. 4. Referring to Fig. 7, the display 400 may include video images 402 of a pair of playing cards representing a dealer's hand, with one of the cards shown face up and the other card being shown face down, and video

images 404 of a pair of playing cards representing a player's hand, with both the cards shown face up. The "dealer" may be the gaming unit 20.

[0066] To allow the player to control the play of the video blackjack game, a plurality of player-selectable buttons may be displayed. The buttons may include a "Cash Out" button 406, a "See Pays" button 408, a "Stay" button 410, a "Hit" button 412, a "Bet One Credit" button 414, and a "Bet Max Credits" button 416. The display 400 may also include an area 418 in which the number of remaining credits or value is displayed. If the display unit 70 is provided with a touch-sensitive screen, the buttons 406, 408, 410, 412, 414, 416 may form part of the video display 400. Alternatively, one or more of those buttons may be provided as part of a control panel that is provided separately from the display unit 70.

[0067] Fig. 9 is a flowchart of the video blackjack routine 220 shown schematically in Fig. 4. Referring to Fig. 9, the video blackjack routine 220 may begin at block 420 where it may determine whether a bet has been made by the player. That may be determined, for example, by detecting the activation of either the "Bet One Credit" button 414 or the "Bet Max Credits" button 416. At block 422, bet data corresponding to the bet made at block 420 may be stored in the memory of the controller 100. At block 424, a dealer's hand and a player's hand may be "dealt" by making the playing card images 402, 404 appear on the display unit 70.

[0068] At block 426, the player may be allowed to be "hit," in which case at block 428 another card will be dealt to the player's hand by making another playing card image 404 appear in the display 400. If the player is hit, block 430 may determine if the player has "bust," or exceeded 21. If the player has not bust, blocks 426 and 428 may be performed again to allow the player to be hit again.

[0069] If the player decides not to hit, at block 432 the routine may determine whether the dealer should be hit. Whether the dealer hits may be determined in accordance with predetermined rules, such as the dealer always hit if the dealer's hand totals 15 or less. If the dealer hits, at block 434 the dealer's hand may be dealt another card by making another playing card image 402 appear in the display 400. At block 436 the routine may determine whether the dealer has bust. If the dealer has not bust, blocks 432, 434 may be performed again to allow the dealer to be hit again.

[0070] If the dealer does not hit, at block 436 the outcome of the blackjack game and a corresponding payout may be determined based on, for example, whether the player or the dealer has the higher hand that does not exceed 21. If the player has a

winning hand, a payout value corresponding to the winning hand may be determined at block 440. At block 442, the player's cumulative value or number of credits may be updated by subtracting the bet made by the player and adding, if the player won, the payout value determined at block 440. The cumulative value or number of credits may 5 also be displayed in the display area 418 (Fig. 7).

#### Slots

[0071] Where the gaming unit 20 is designed to facilitate play of a video slots game, the display unit 70 may comprise a video display unit. Fig. 10 is an exemplary display 450 that may be shown on the display unit 70 during performance of the slots 10 routine 230 shown schematically in Fig. 4. Referring to Fig. 10, the display 450 may include video images 452 of a plurality of slot machine reels, each of the reels having a plurality of reel symbols 454 associated therewith. Although the display 450 shows five reel images 452, each of which may have three reel symbols 454 that are visible at a time, other reel configurations could be utilized.

15 [0072] To allow the player to control the play of the slots game, a plurality of player-selectable buttons may be displayed. The buttons may include a "Cash Out" button 456, a "See Pays" button 458, a plurality of payline-selection buttons 460 each of which allows the player to select a different number of paylines prior to "spinning" the reels, a plurality of bet-selection buttons 462 each of which allows a player to specify a 20 wager amount for each payline selected, a "Spin" button 464, and a "Max Bet" button 466 to allow a player to make the maximum wager allowable.

[0073] Fig. 12 is a flowchart of the slots routine 230 shown schematically in Fig. 10. Referring to Fig. 12, at block 470, the routine may determine whether the player has requested payout information, such as by activating the "See Pays" button 458, in which 25 case at block 472 the routine may cause one or more pay tables to be displayed on the display unit 70. At block 474, the routine may determine whether the player has pressed one of the payline-selection buttons 460, in which case at block 476 data corresponding to the number of paylines selected by the player may be stored in the memory of the controller 100. At block 478, the routine may determine whether the player has pressed 30 one of the bet-selection buttons 462, in which case at block 480 data corresponding to the amount bet per payline may be stored in the memory of the controller 100. At block 482, the routine may determine whether the player has pressed the "Max Bet" button 466, in which case at block 484 bet data (which may include both payline data and bet-per-payline data) corresponding to the maximum allowable bet may be stored in the memory

of the controller 100.

[0074] If the "Spin" button 464 has been activated by the player as determined at block 486, at block 488 the routine may cause the slot machine reel images 452 to begin "spinning" so as to simulate the appearance of a plurality of spinning mechanical slot machine reels. At block 490, the routine may determine the positions at which the slot machine reel images will stop, or the particular symbol images 454 that will be displayed when the reel images 452 stop spinning. At block 492, the routine may stop the reel images 452 from spinning by displaying stationary reel images 452 and images of three symbols 454 for each stopped reel image 452. The virtual reels may be stopped from left to right, from the perspective of the player, or in any other manner or sequence.

[0075] The routine may provide for the possibility of a bonus game or round if certain conditions are met, such as the display in the stopped reel images 452 of a particular symbol 454. If there is such a bonus condition as determined at block 494, the routine may proceed to block 496 where a bonus round may be played. The bonus round may be a different game than slots, and many other types of bonus games could be provided. If the player wins the bonus round, or receives additional credits or points in the bonus round, a bonus value may be determined at block 498. A payout value corresponding to outcome of the slots game and/or the bonus round may be determined at block 500. At block 502, the player's cumulative value or number of credits may be updated by subtracting the bet made by the player and adding, if the slot game and/or bonus round was a winner, the payout value determined at block 500.

[0076] Although the above routine has been described as a virtual slot machine routine in which slot machine reels are represented as images on the display unit 70, actual slot machine reels that are capable of being spun may be utilized instead, in which case the display unit 70 could be provided in the form of a plurality of mechanical reels that are rotatable, each of the reels having a plurality of reel images disposed thereon.

#### Video Keno

[0077] Where the gaming unit 20 is designed to facilitate play of a video keno game, the display unit 70 may comprise a video display unit. Fig. 11 is an exemplary display 520 that may be shown on the display unit 70 during performance of the video keno routine 240 shown schematically in Fig. 4. Referring to Fig. 11, the display 520 may include a video image 522 of a plurality of numbers that were selected by the player prior to the start of a keno game and a video image 524 of a plurality of numbers randomly

selected during the keno game. The randomly selected numbers may be displayed in a grid pattern.

[0078] To allow the player to control the play of the keno game, a plurality of player-selectable buttons may be displayed. The buttons may include a "Cash Out" 5 button 526, a "See Pays" button 528, a "Bet One Credit" button 530, a "Bet Max Credits" button 532, a "Select Ticket" button 534, a "Select Number" button 536, and a "Play" button 538. The display 520 may also include an area 540 in which the number of remaining credits or value is displayed. If the display unit 70 is provided with a touch-sensitive screen, the buttons may form part of the video display 520.

10 Alternatively, one or more of those buttons may be provided as part of a control panel that is provided separately from the display unit 70.

[0079] Fig. 13 is a flowchart of the video keno routine 240 shown schematically in Fig. 4. The keno routine 240 may be utilized in connection with a single gaming unit 20 where a single player is playing a keno game, or the keno routine 240 may be utilized in 15 connection with multiple gaming units 20 where multiple players are playing a single keno game. In the latter case, one or more of the acts described below may be performed either by the controller 100 in each gaming unit or by one of the network computer 22, 32 to which multiple gaming units 20 are operatively connected.

[0080] Referring to Fig. 13, at block 550, the routine may determine whether the 20 player has requested payout information, such as by activating the "See Pays" button 528, in which case at block 552 the routine may cause one or more pay tables to be displayed on the display unit 70. At block 554, the routine may determine whether the player has made a bet, such as by having pressed the "Bet One Credit" button 530 or the "Bet Max Credits" button 532, in which case at block 556 bet data corresponding to the bet made by 25 the player may be stored in the memory of the controller 100. After the player has made a wager, at block 558 the player may select a keno ticket, and at block 560 the ticket may be displayed on the display 520. At block 562, the player may select one or more game numbers, which may be within a range set by the casino. After being selected, the player's game numbers may be stored in the memory of the controller 100 at block 564 and may be 30 included in the image 522 on the display 520 at block 566. After a certain amount of time, the keno game may be closed to additional players (where a number of players are playing a single keno game using multiple gambling units 20).

[0081] If play of the keno game is to begin as determined at block 568, at block 570 a game number within a range set by the casino may be randomly selected either by

the controller 100 or a central computer operatively connected to the controller, such as one of the network computers 22, 32. At block 572, the randomly selected game number may be displayed on the display unit 70 and the display units 70 of other gaming units 20 (if any) which are involved in the same keno game. At block 574, the controller 100 (or the central computer noted above) may increment a count which keeps track of how many game numbers have been selected at block 570.

5 [0082] At block 576, the controller 100 (or one of the network computers 22, 32) may determine whether a maximum number of game numbers within the range have been randomly selected. If not, another game number may be randomly selected at block 570.

10 10 If the maximum number of game numbers has been selected, at block 578 the controller 100 (or a central computer) may determine whether there are a sufficient number of matches between the game numbers selected by the player and the game numbers selected at block 570 to cause the player to win. The number of matches may depend on how many numbers the player selected and the particular keno rules being used.

15 [0083] If there are a sufficient number of matches, a payout may be determined at block 580 to compensate the player for winning the game. The payout may depend on the number of matches between the game numbers selected by the player and the game numbers randomly selected at block 570. At block 582, the player's cumulative value or number of credits may be updated by subtracting the bet made by the player and adding, if 20 the keno game was won, the payout value determined at block 580. The cumulative value or number of credits may also be displayed in the display area 540 (Fig. 11).

#### Video Bingo

[0084] Where the gaming unit 20 is designed to facilitate play of a video bingo game, the display unit 70 may comprise a video display unit. Fig. 14 is an exemplary display 600 that may be shown on the display unit 70 during performance of the video bingo routine 250 shown schematically in Fig. 4. Referring to Fig. 14, the display 600 may include one or more video images 602 of a bingo card and images of the bingo numbers selected during the game. The bingo card images 602 may have a grid pattern.

25 [0085] To allow the player to control the play of the bingo game, a plurality of player-selectable buttons may be displayed. The buttons may include a "Cash Out" button 604, a "See Pays" button 606, a "Bet One Credit" button 608, a "Bet Max Credits" button 610, a "Select Card" button 612, and a "Play" button 614. The display 600 may also 30 include an area 616 in which the number of remaining credits or value is displayed. If the display unit 70 is provided with a touch-sensitive screen, the buttons may form part

of the video display 600. Alternatively, one or more of those buttons may be provided as part of a control panel that is provided separately from the display unit 70.

[0086] Fig. 15 is a flowchart of the video bingo routine 250 shown schematically in Fig. 4. The bingo routine 250 may be utilized in connection with a single gaming unit 20 where a single player is playing a bingo game, or the bingo routine 250 may be utilized in connection with multiple gaming units 20 where multiple players are playing a single bingo game. In the latter case, one or more of the acts described below may be performed either by the controller 100 in each gaming unit 20 or by one of the network computers 22, 32 to which multiple gaming units 20 are operatively connected.

10 [0087] Referring to Fig. 15, at block 620, the routine may determine whether the player has requested payout information, such as by activating the "See Pays" button 606, in which case at block 622 the routine may cause one or more pay tables to be displayed on the display unit 70. At block 624, the routine may determine whether the player has made a bet, such as by having pressed the "Bet One Credit" button 608 or the 15 "Bet Max Credits" button 610, in which case at block 626 bet data corresponding to the bet made by the player may be stored in the memory of the controller 100.

[0088] After the player has made a wager, at block 628 the player may select a bingo card, which may be generated randomly. The player may select more than one bingo card, and there may be a maximum number of bingo cards that a player may select. After play is 20 to commence as determined at block 632, at block 634 a bingo number may be randomly generated by the controller 100 or a central computer such as one of the network computers 22, 32. At block 636, the bingo number may be displayed on the display unit 70 and the display units 70 of any other gaming units 20 involved in the bingo game.

[0089] At block 638, the controller 100 (or a central computer) may determine 25 whether any player has won the bingo game. If no player has won, another bingo number may be randomly selected at block 634. If any player has bingo as determined at block 638, the routine may determine at block 640 whether the player playing that gaming unit 20 was the winner. If so, at block 642 a payout for the player may be determined. The payout may depend on the number of random numbers that were 30 drawn before there was a winner, the total number of winners (if there was more than one player), and the amount of money that was wagered on the game. At block 644, the player's cumulative value or number of credits may be updated by subtracting the bet made by the player and adding, if the bingo game was won, the payout value determined at block 642. The cumulative value or number of credits may also be

displayed in the display area 616 (Fig. 14).

#### Electronic Inserts

[0090] Figs. 16A and 16B are illustrations of a portion the display 70 (shown in Fig. 2) that may include electronic inserts 71. Electronic inserts 71 may be 5 formed with electronic ink or the like. Electronic inserts 71 may have a plurality of viewable elements 700 that can be controlled in a similar manner as pixels are controlled on a standard cathode ray tube (CRT) display. Each electronic ink element 700 may include a plurality of positively charged particles 702 and a plurality of negatively charged particles 704 suspended in a clear fluid. The particles 702, 704 10 are depicted as forming a "solid" half of each element 700 in a homogeneous manner for clarity, however, it should be understood there are many actual particles 702, 704 in each element 700. The particles 702, 704 may be formed from materials that can permanently hold a positive or negative electronic charge. The materials may include mixtures of iron, nickel, and cobalt and others known to those skilled in the 15 art. The positive charged particles 702 may be colored white and the negatively charged particles 704 may be colored black. However, the particle charge may be reversed such that the negatively charged particles 702 are white and the positively charged particles 704 are black. Alternatively, other binary color schemes may be used as desired.

[0091] The electronic inserts 71 may include a plurality of first electrodes 706 20 labeled C<sub>1</sub>, C<sub>2</sub>, C<sub>3</sub> ... C<sub>m</sub>. The electronic inserts 71 may include a second electrode 708 that when used in conjunction with the first electrodes 706 may form an electric field that may act on each element 700 independently. The electrodes 706, 708 are depicted as individual rectangular shapes for illustrative purposes only. The electrodes 706, 708 may be integrally formed within thin film transparent polymer layers that are 25 known to those skilled in the art. The polymer film may be laminated to a layer of circuitry. The circuitry may form a pattern of "pixels" that are controlled by the controller 100. Electronic ink film (not shown) may be used with virtually any type of surface material including, but not limited to, glass, plastic, fabric, and paper. Electronic ink inserts 71 may be used as a display replacement for static inserts, dot 30 matrix displays, and multi segment displays, etc. Additional information on electronic ink can be found on the internet at [www.eink.com](http://www.eink.com).

[0092] Fig. 16A shows the electronic ink elements 700 having white particles 702 and black particles 704 randomly positioned within each element 700 prior to an electric field being generated by the electrodes 706, 708. Fig. 16B shows the

elements 700 after an electric field has been applied to an electronic insert 71. A first set of electrodes 706, labeled c1, c2, c3, c7, c8, and c10 may have positive fields applied thereto and thus have the positively charged white particles 702 positioned in the viewable top portion of the element 700. The remaining elements may be 5 negatively charged which causes the black particles 704 to move to the viewable portion of the elements 700. In this manner the entire display 70 may be controlled to depict readable alpha numeric text and/or graphics thereon.

[0093] Fig. 17 shows a partial display area 718 of the gaming unit 20 illustrating a plurality of electronic display inserts 71 positioned on the display area 10 718. The electronic inserts 71 may include, but are not limited to, electronic text messaging such as general customer information, number of credits, pay lines, number of coins won, denomination input, pay tables, and the like. The electronic inserts 71 may be formed with electronic ink as described above so that the game can be changed quickly via electronic means without having to shut the game down and 15 manually remove and replace old static inserts (not shown) with new static inserts (not shown).

[0094] Fig. 18 is a flowchart 750 of a control routine for an electronic ink display 71 on a gaming unit 20. The controller 100 may start at block 752 and may determine whether to start up after power up at block 754. If the response to the query 20 754 is yes, then the controller 100 may retrieve downloaded information for the electronic inserts 71 at block 756. If the answer to query 754 is no, then the refresh timer for the electronic inserts 71 may start at block 758. The refresh time is determined by how long the electronic ink elements 700 will hold a charge and remain readable. The refresh timeframe is a function of the type of the electronic ink 25 elements 700 being used, but will typically last from a few hours to a few days. After block 756, the controller 100 may send information to the display at block 760 before moving to block 758. The controller 100 may query whether the timer has timed out at block 762. If the timer has timed out, then the display may be refreshed at block 764. If the timer has not timed out, then the controller 100 may 30 wait until the timer has run out at block 766. The controller may enter a power save mode at block 768 while waiting for the timer to run out. The controller 100 may continue to check the timer at block 762 while in power save mode.

[0095] The electronic inserts 71 are not limited to electronic ink displays. On the contrary, the present invention contemplates any display that includes a bi-stable image. A

bi-stable image is an image that remains visible without electrical power or backlighting. The image is stored on the display and is viewed in reflective light. The bi-stable image may also include a bi-refrengent image. A bi-refrengent image is one that reflects different images when the display is moved relative to the viewer.

5 Additional information on No Power Cholesteric Liquid Crystal Display Products can be found on the internet at [www.kentdisplays.com](http://www.kentdisplays.com). Additional information on Smart Paper Products can be found on the internet at [www.gyricon.com](http://www.gyricon.com). Additional information on Micro-Electromechanical Display Products can be found on the internet at [www.iridigm.com](http://www.iridigm.com).

**WHAT IS CLAIMED IS:**

1. A gaming apparatus, comprising:
  - a housing;
  - a display unit disposed on the housing, the display unit adapted to display denomination input, maximum coin input, maximum coin jackpot, pay tables, paylines, and predetermined customer advertisements;
  - 5 at least one electronic insert associated with the display unit, the electronic insert including a plurality of electronic ink elements with permanently charged particles suspended in a clear fluid, the charged particles formed in first and second types, the first type having a first color and a positive charge and the second type having a second color and a negative charge, each element having first and second electrodes for imparting an electrical charge thereto;
  - 10 a value input device;
  - a controller operatively coupled to the display unit and the value input device, the controller comprising a processor and a memory operatively coupled to the processor; the controller being programmed to cause the display unit to generate a game display relating to one of the following games: poker, blackjack, slots, keno or bingo; the controller being programmed to selectively control the electrodes to change the information displayed by the inserts while the apparatus remains operational; and the controller being programmed to determine a value payout associated with an outcome of the game.
  - 15
2. A gaming apparatus as defined in claim 1, wherein the display unit comprises a video display unit that is capable of generating video images.
3. A gaming apparatus as defined in claim 2, wherein the controller is programmed to cause at least one electronic insert to display a video image comprising an image of at least five playing cards to be displayed if the game comprises video poker; wherein the controller is programmed to cause at least one electronic insert to display a video image comprising an image of a plurality of simulated slot machine reels to be displayed if the game comprises video slots; wherein the controller is programmed to cause at least one electronic insert to display a video image comprising an image of a plurality of playing cards to be displayed if the game comprises video blackjack; wherein the controller is programmed to cause at least one electronic insert to display a video image comprising an image of a plurality of keno numbers to be displayed if the game comprises video keno; and wherein the controller is
- 20
- 25
- 30

programmed to cause at least one electronic insert to display a video image comprising an image of a bingo grid to be displayed if the game comprises video bingo.

4. A gaming apparatus as defined in claim 1, wherein the electronic ink elements further comprise: black particles having a negative charge and white particles having a positive charge suspended in the clear fluid, the elements being viewable when the white particles are positioned in a viewable portion of the element.
5. A gaming apparatus as defined in claim 4, wherein the white particles move to the viewable portion of the element when a negative electric field is applied by the electrodes to the element and the black particles move to the viewable portion of the element when a positive electric field is applied by the electrodes to the element.
10. A gaming apparatus, comprising:
  15. a display unit having at least one electronic insert, each electronic insert having a plurality of electronic ink elements with a first type of permanently charged particles and a second type of permanently charged particles suspended in a clear fluid, the first type of particles having a first color and a positive charge and the second type of particles having a second color and a negative charge;
  20. a value input device;
  25. a controller operatively coupled to the display unit and the value input device, the controller comprising a processor and a memory operatively coupled to the processor; the controller being programmed to receive data representing a payline selection made by a player; the controller being programmed to cause a game display to be generated by the display unit, the game display comprising images of a plurality of slot machine symbols each of which is associated with a respective slot machine reel; the controller being programmed to selectively change the display inserts while the apparatus remains operational; and the controller being programmed to determine a value payout associated with an outcome of the slots game, the controller being programmed to determine the outcome of the slots game based on a configuration of the slot machine symbols.
  30. 7. A gaming apparatus as defined in claim 6, wherein the display unit comprises a video display unit that is capable of generating video images.
  8. A gaming apparatus as defined in claim 7, wherein the controller is programmed to cause a video image comprising an image of a plurality of simulated slot machine reels to be displayed on the display unit.
  9. A gaming apparatus as defined in claim 6, wherein the first type of particles has

a white color and the second type of particles has a black color.

10. A gaming apparatus as defined in claim 9, wherein the element becomes viewable when the white particles are positioned in a viewable portion of the element.

5 11. A gaming apparatus as defined in claim 10, wherein the white particles move to the viewable portion when a negative electric field is applied to the element and the black particles move to the viewable portion when a positive electric field is applied to the element.

10 12. A gaming system comprising a plurality of gaming apparatuses as defined in claim 6, the gaming apparatuses being interconnected to form a network of gaming apparatuses.

13. A gaming method, comprising:

displaying of one of the following games: poker, blackjack, slots, keno or bingo with an electronic display having at least one electronic insert, each electronic 15 insert including a plurality of electronic ink elements with a first type of permanently charged particles and a second type of permanently charged particles suspended in a clear fluid, the first type of particles having a first color and a positive charge and the second type of particles having a second color and a negative charge;

20 determining a value payout associated with an outcome of the game represented by the video image; and

electronically changing information displayed by the electronic display inserts while the game remains operational.

14. A gaming method as defined in claim 13, additionally comprising forming display information with the inserts using electronic ink.

25 15. A gaming method as defined in claim 14, wherein the electronic ink forming step comprises:

forming a plurality of elements;

adding clear fluid to the elements; and

30 placing negatively charged black particles and positively charged white particles into the fluid, wherein the elements are viewable when white particles are positioned in a viewable portion of the element.

16. A gaming apparatus as defined in claim 15, further comprising:

moving the white particles to the viewable portion when a negative electric field is applied to the element; and

moving the black particles to the viewable portion when a positive electric field is applied to the element.

17. A method of controlling an electronic display on a gaming machine comprising:

5 supplying electrical power to a controller and the display unit having at least one electronic insert, each electronic insert including a plurality of electronic ink elements with a first type of permanently charged particles and a second type of permanently charged particles suspended in a clear fluid, the first type of particles having a first color and positive charge and the second type of particles having a 10 second color and a negative charge;

downloading information to the electronic display;

retrieving download information for the display;

starting a write timer to determine a refresh time for the display;

determining whether the write timer has timed out;

15 refreshing the display after the timer has timed out;

entering a power save mode for a predetermined period of time; and

refreshing the display after the predetermined period of time has elapsed.

18. A gaming apparatus, comprising:

a housing;

20 a display unit disposed on the housing, the display unit adapted to display denomination input, maximum coin input, maximum coin jackpot, pay tables, paylines, and predetermined customer advertisements;

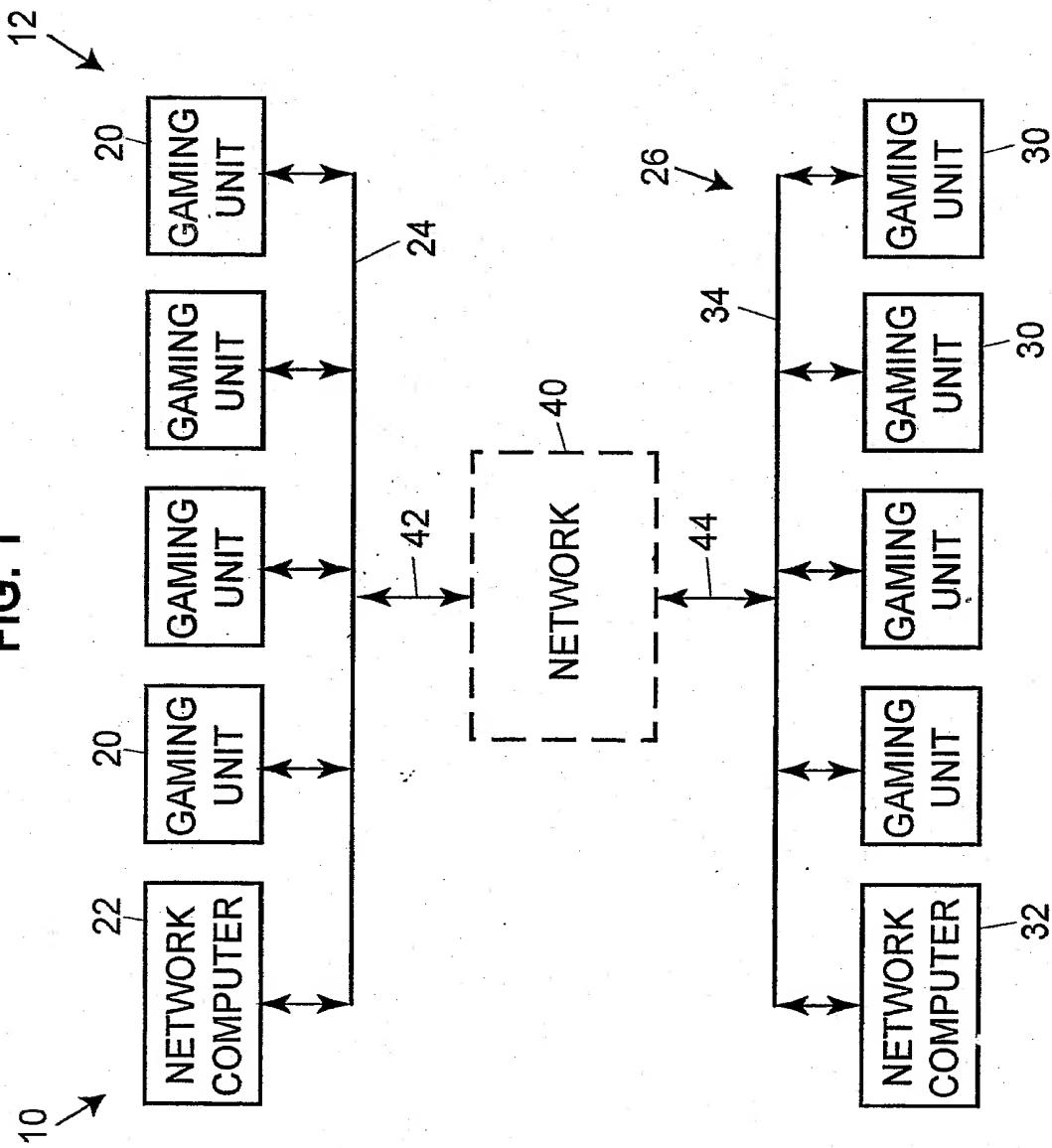
at least one electronic insert associated with the display unit, the electronic insert including a bi-stable image, wherein the display retains the image without electrical power or backlighting;

25 a value input device;

a controller operatively coupled to the display unit and the value input device, the controller comprising a processor and a memory operatively coupled to the processor; the controller being programmed to cause the display unit to generate a game 30 display relating to one of the following games: poker, blackjack, slots, keno or bingo; the controller being programmed to selectively change the information displayed by the inserts while the apparatus remains operational; and the controller being programmed to determine a value payout associated with an outcome of the game.

19. A gaming apparatus as defined in claim 18, wherein the display unit comprises a video display unit that is capable of generating video images.
20. A gaming apparatus as defined in claim 19, wherein the controller is programmed to cause at least one electronic insert to display a video image comprising an image of at least five playing cards to be displayed if the game comprises video poker; wherein the controller is programmed to cause at least one electronic insert to display a video image comprising an image of a plurality of simulated slot machine reels to be displayed if the game comprises video slots; wherein the controller is programmed to cause at least one electronic insert to display a video image comprising an image of a plurality of playing cards to be displayed if the game comprises video blackjack; wherein the controller is programmed to cause at least one electronic insert to display a video image comprising an image of a plurality of keno numbers to be displayed if the game comprises video keno; and wherein the controller is programmed to cause at least one electronic insert to display a video image comprising an image of a bingo grid to be displayed if the game comprises video bingo.
21. A gaming apparatus as defined in claim 18, wherein the bistable image includes a birefringent image.
22. A gaming apparatus as defined in claim 18, wherein the bistable image includes an electronic ink image.

FIG. 1



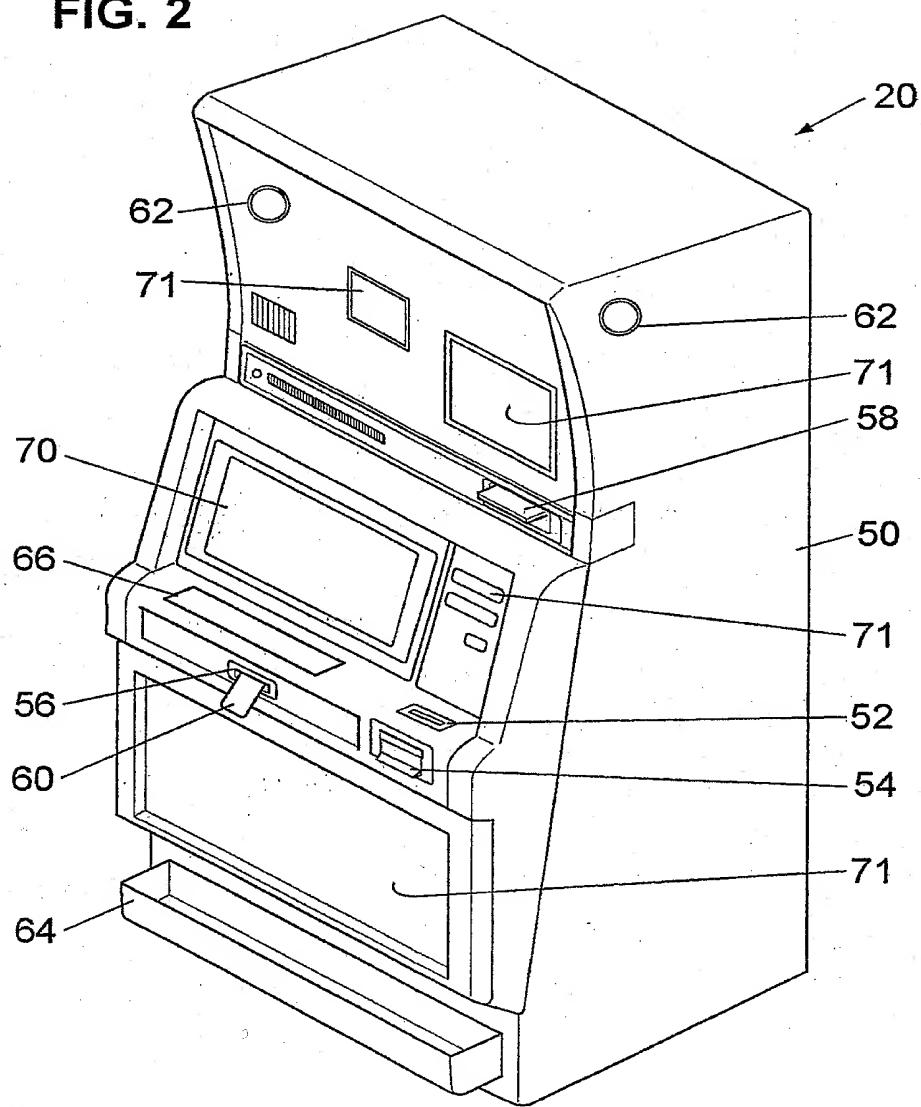
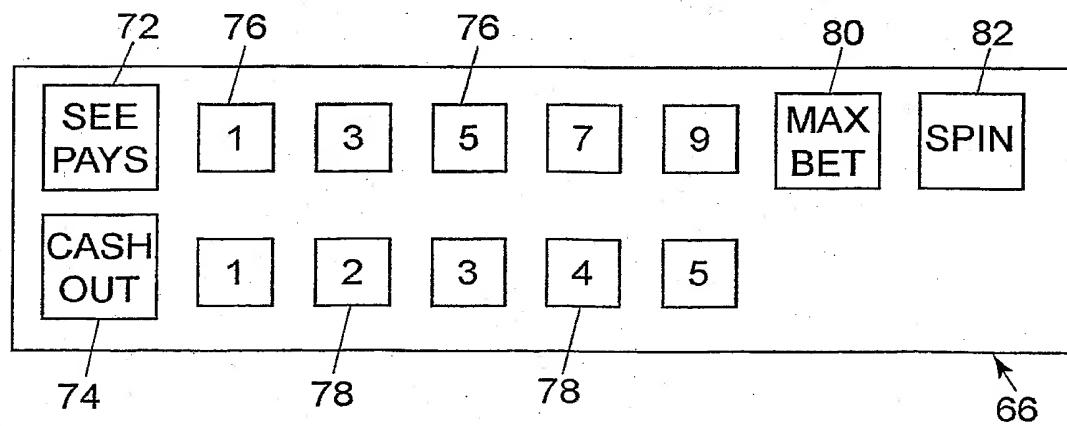
**FIG. 2****FIG. 2A**

FIG. 3

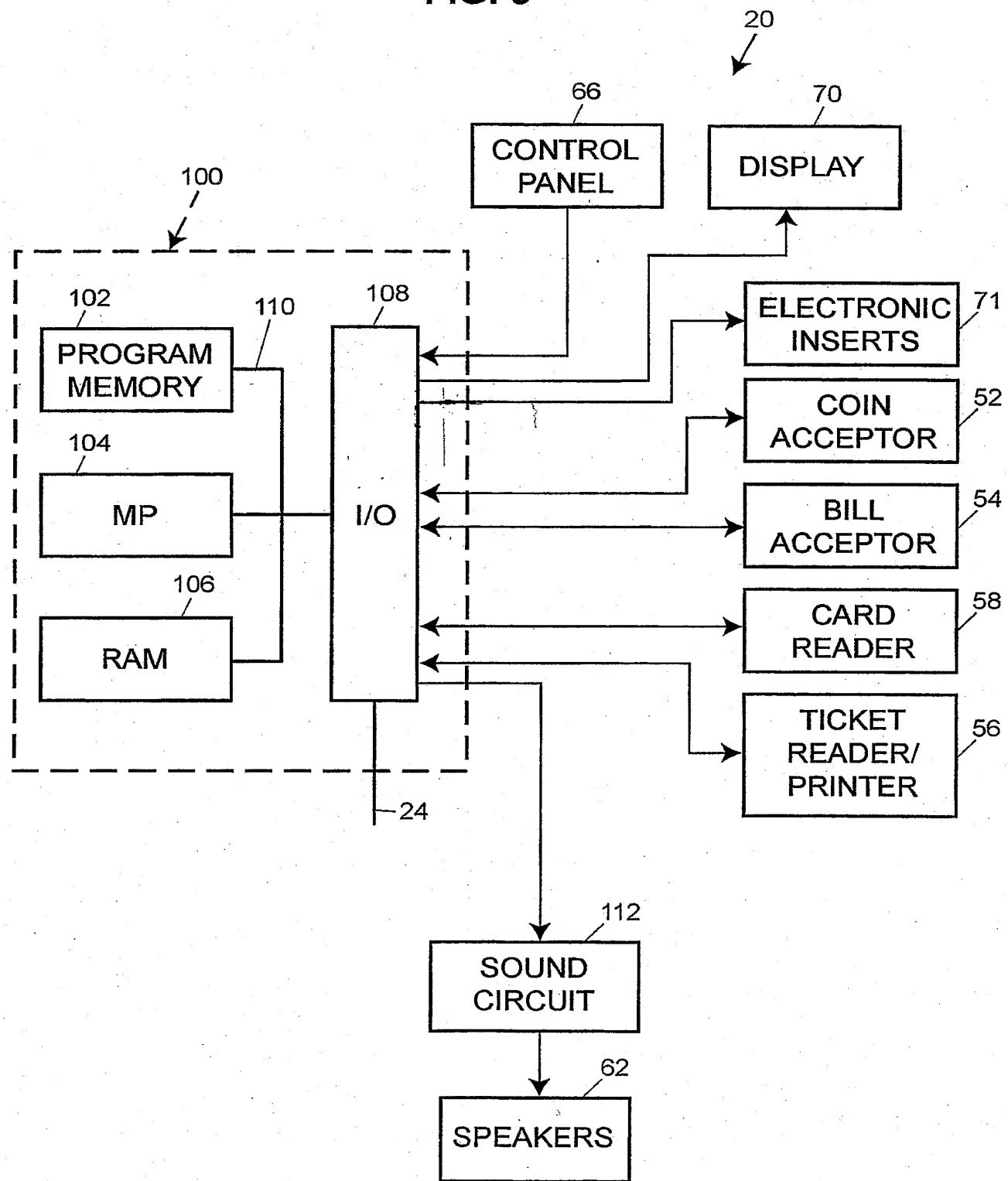
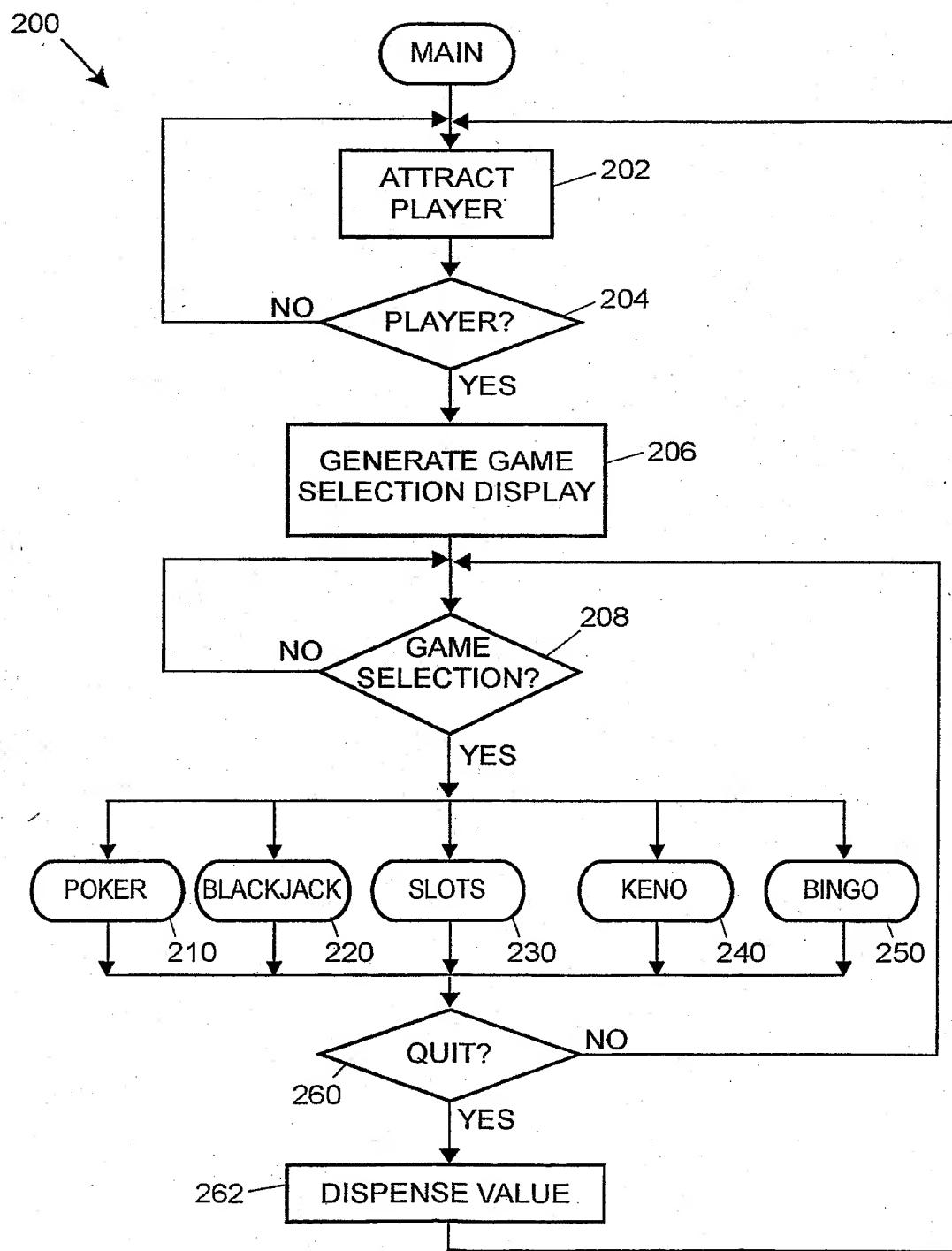


FIG. 4



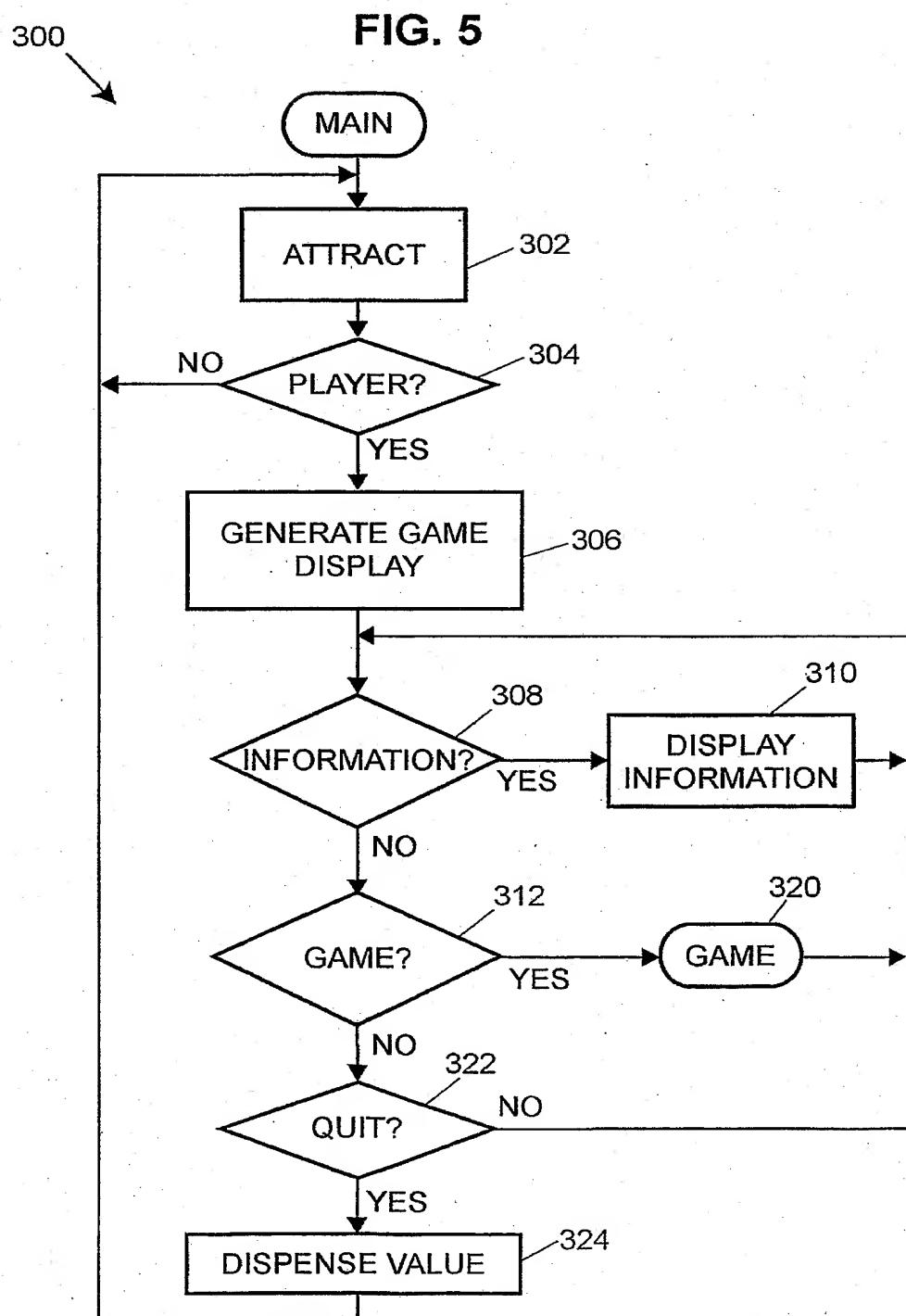


FIG. 6

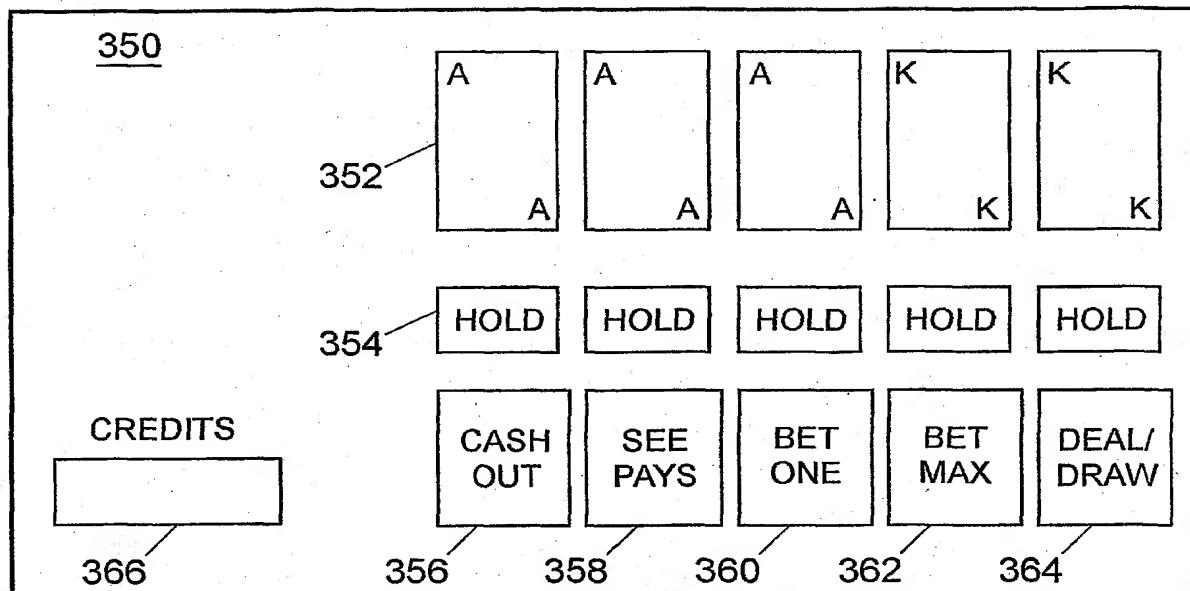


FIG. 7

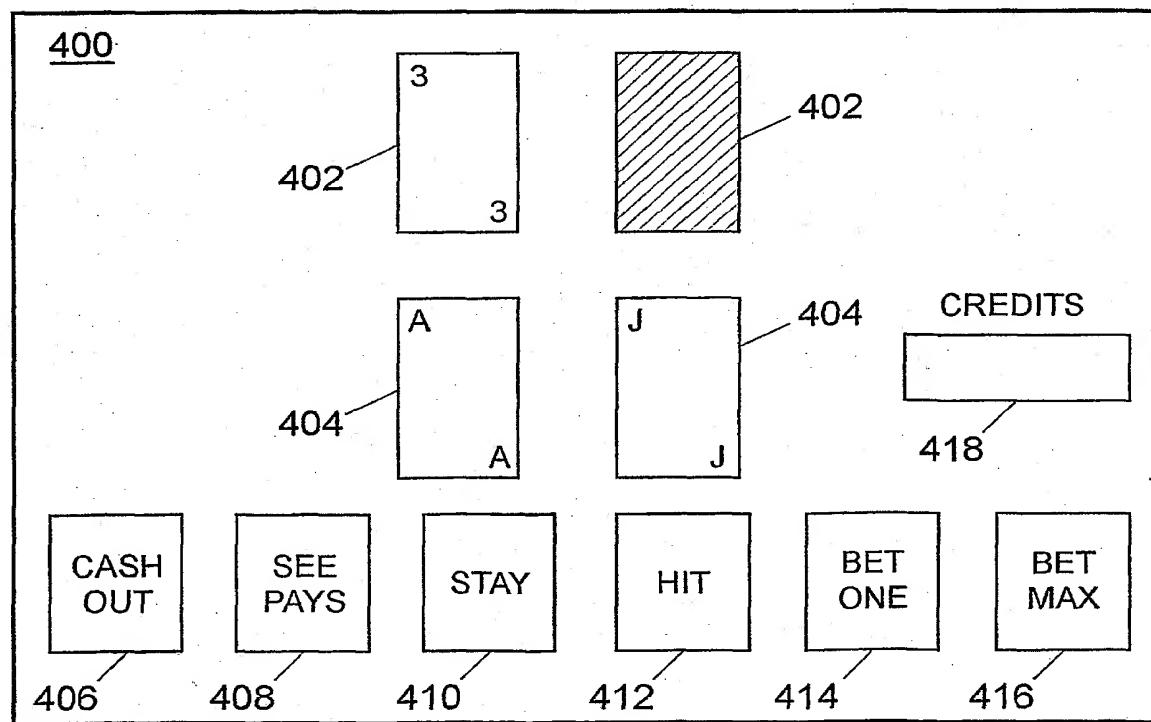


FIG. 8

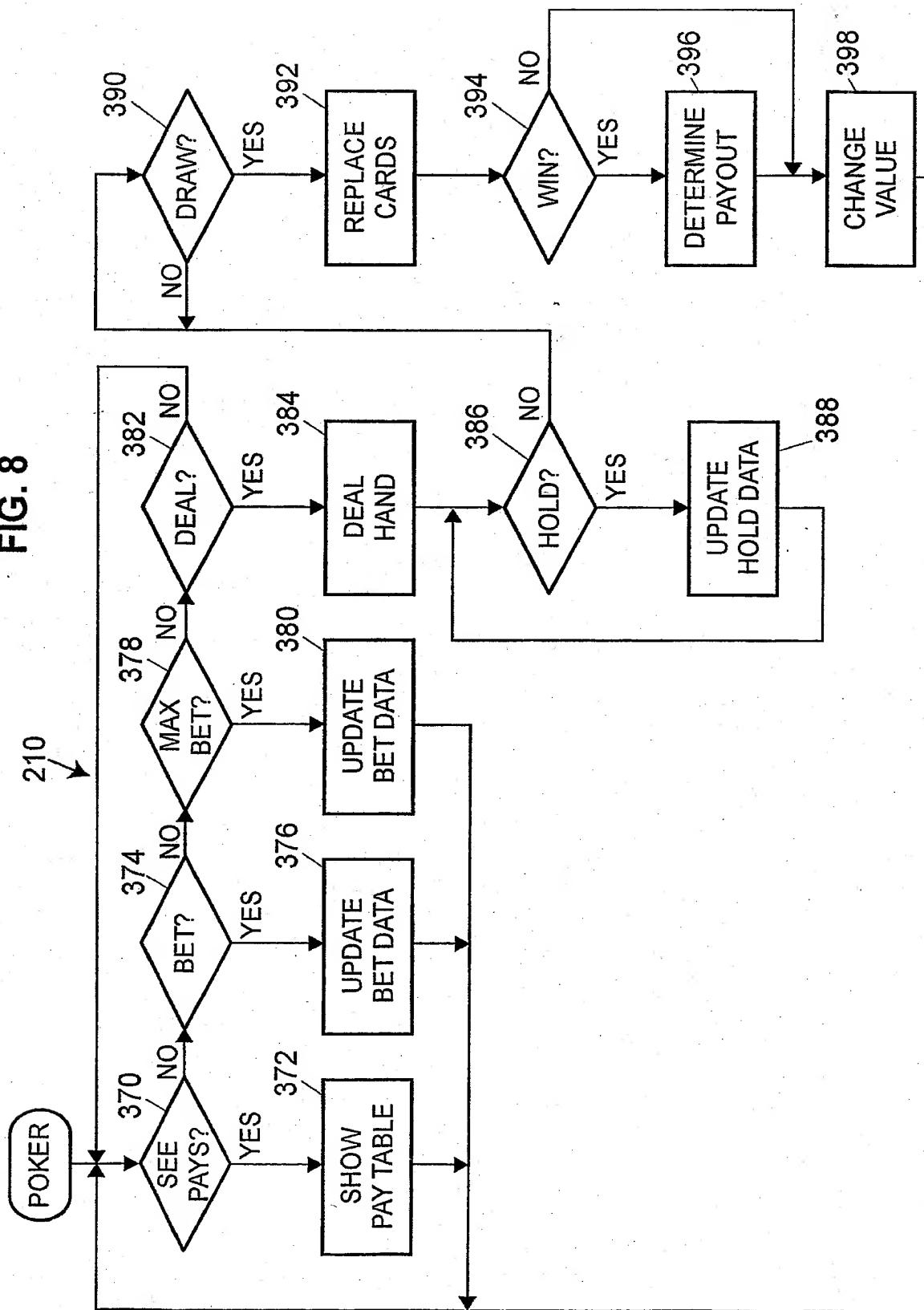


FIG. 9

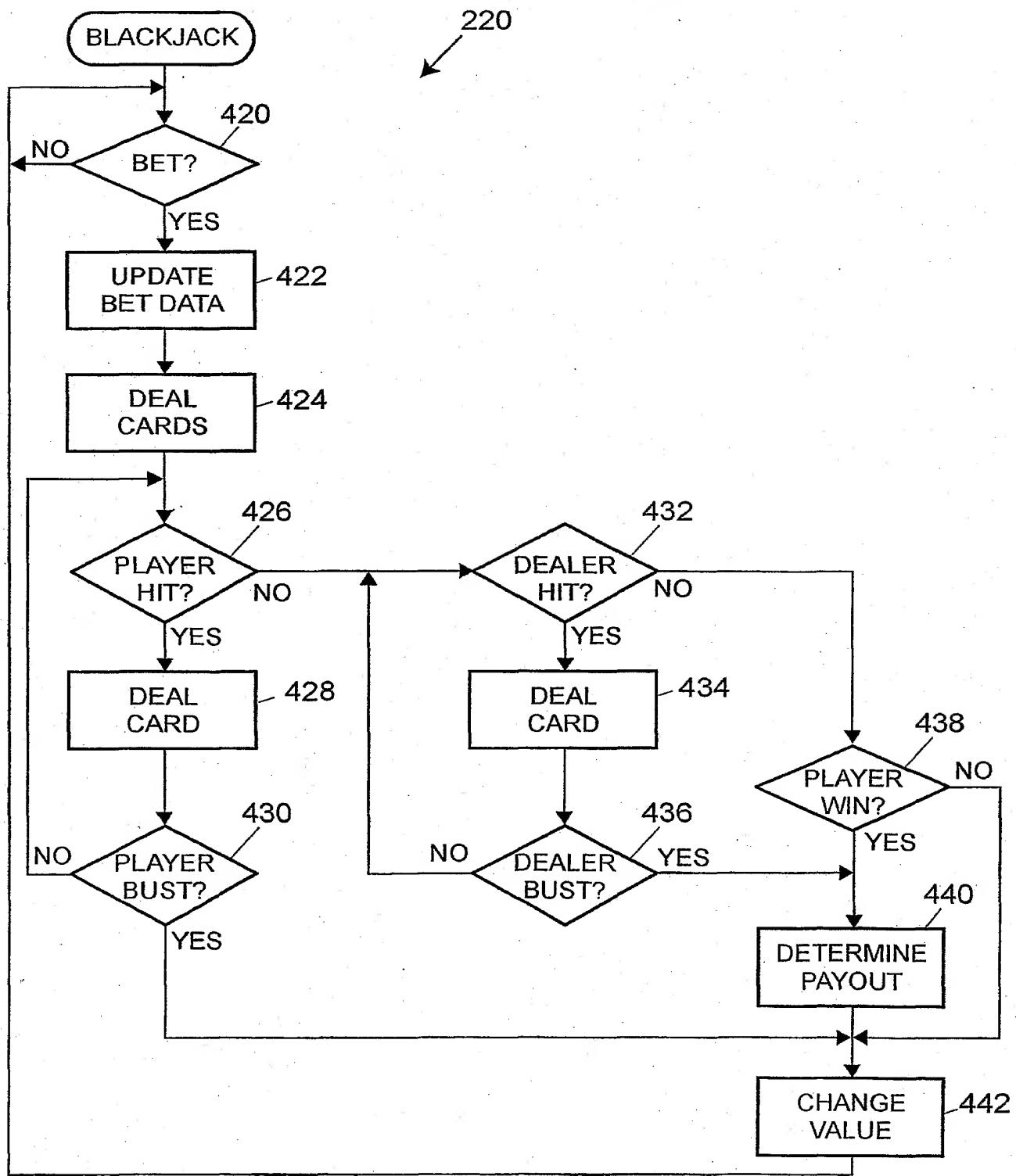


FIG. 10

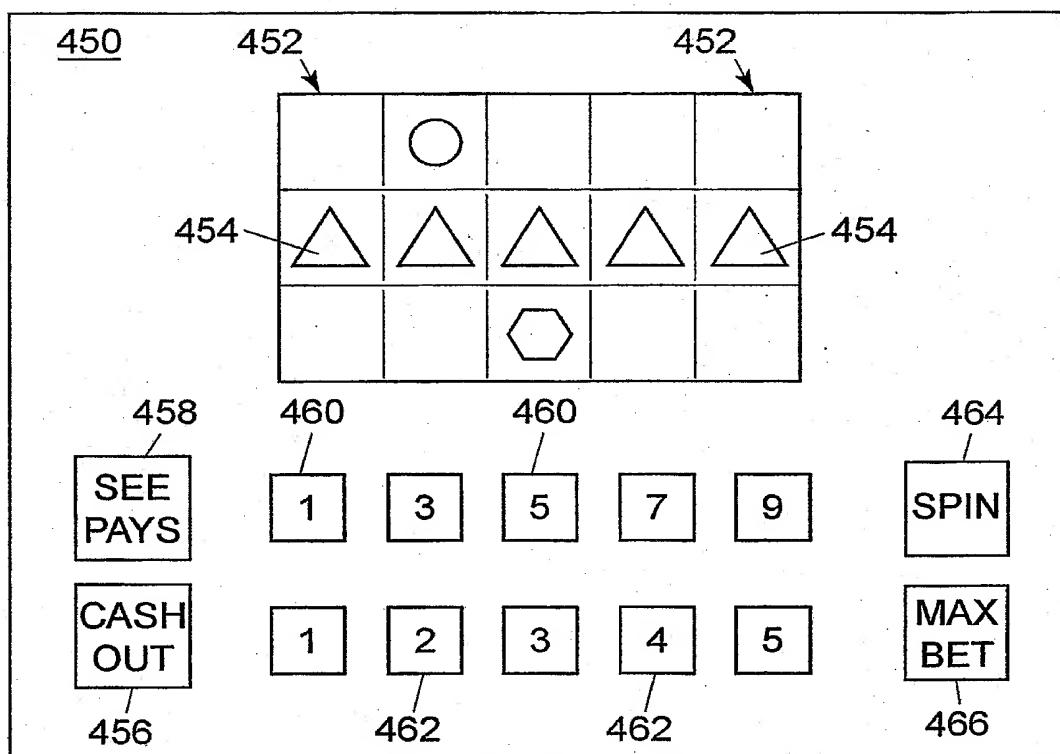


FIG. 11

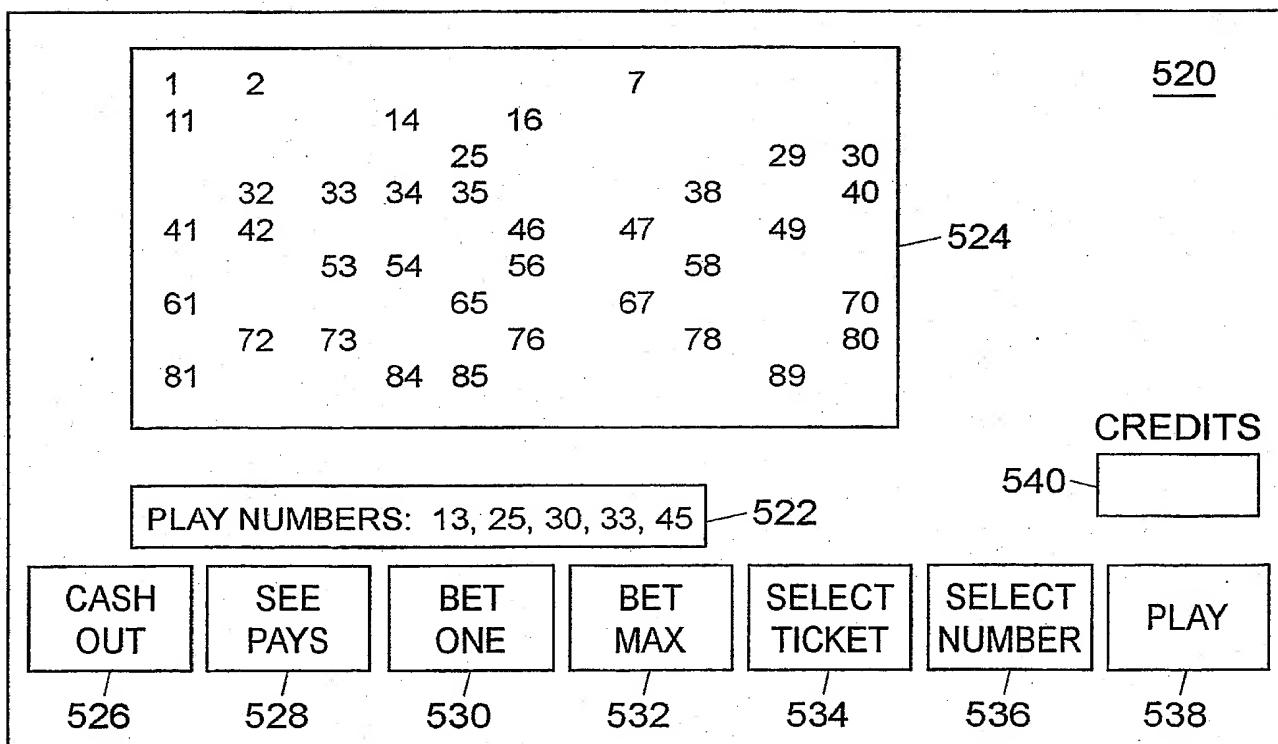
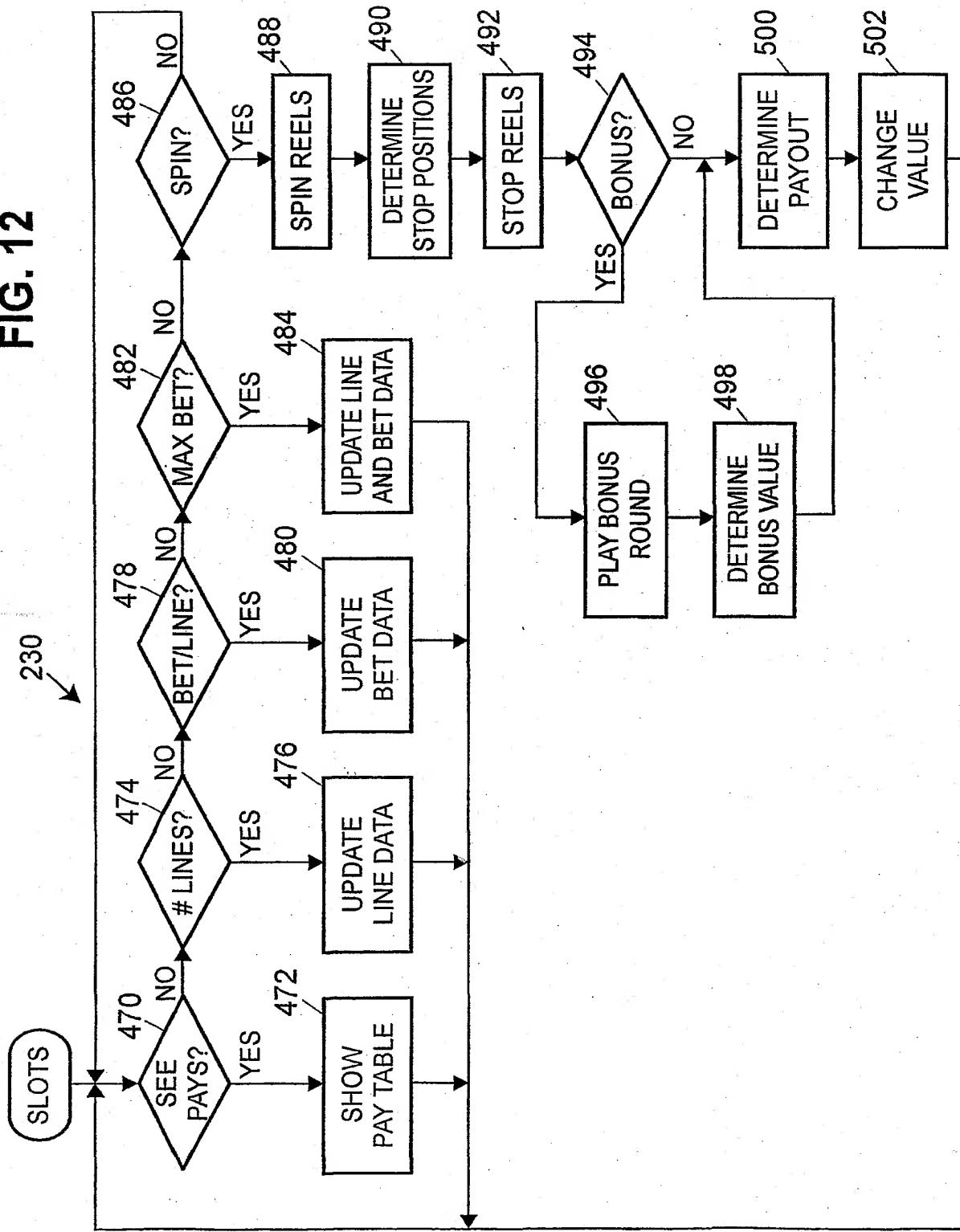


FIG. 12



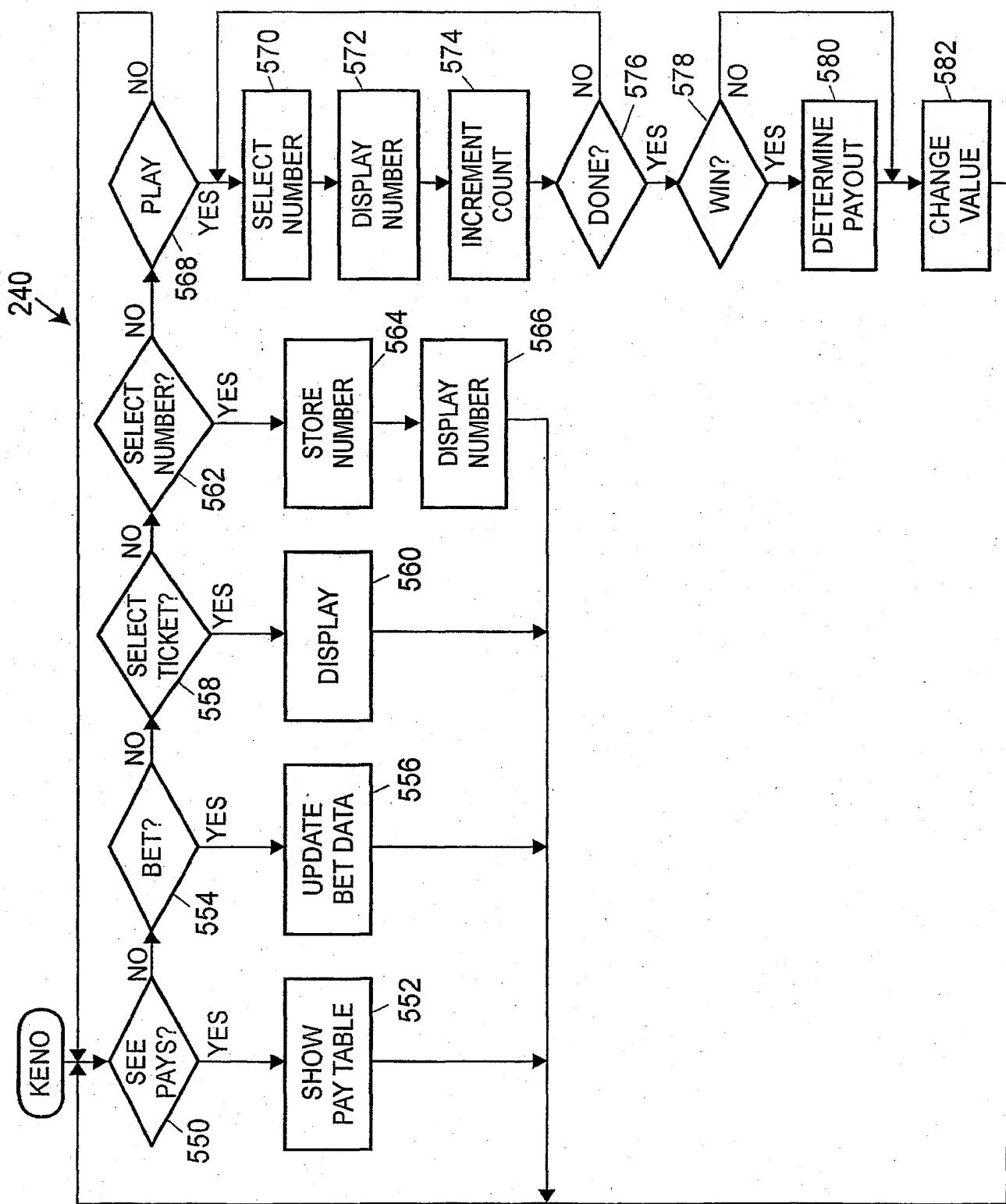


FIG. 13

FIG. 14

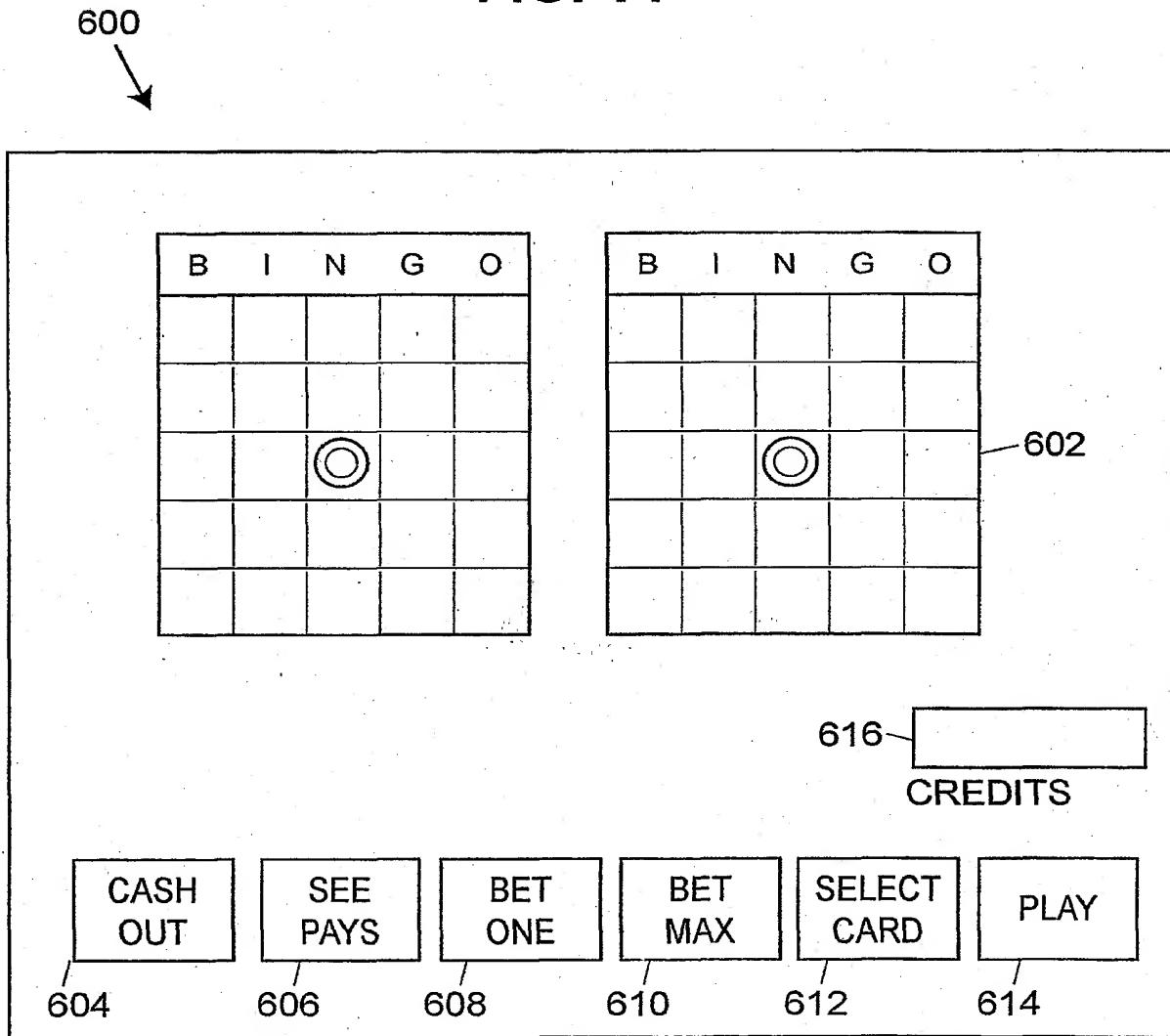
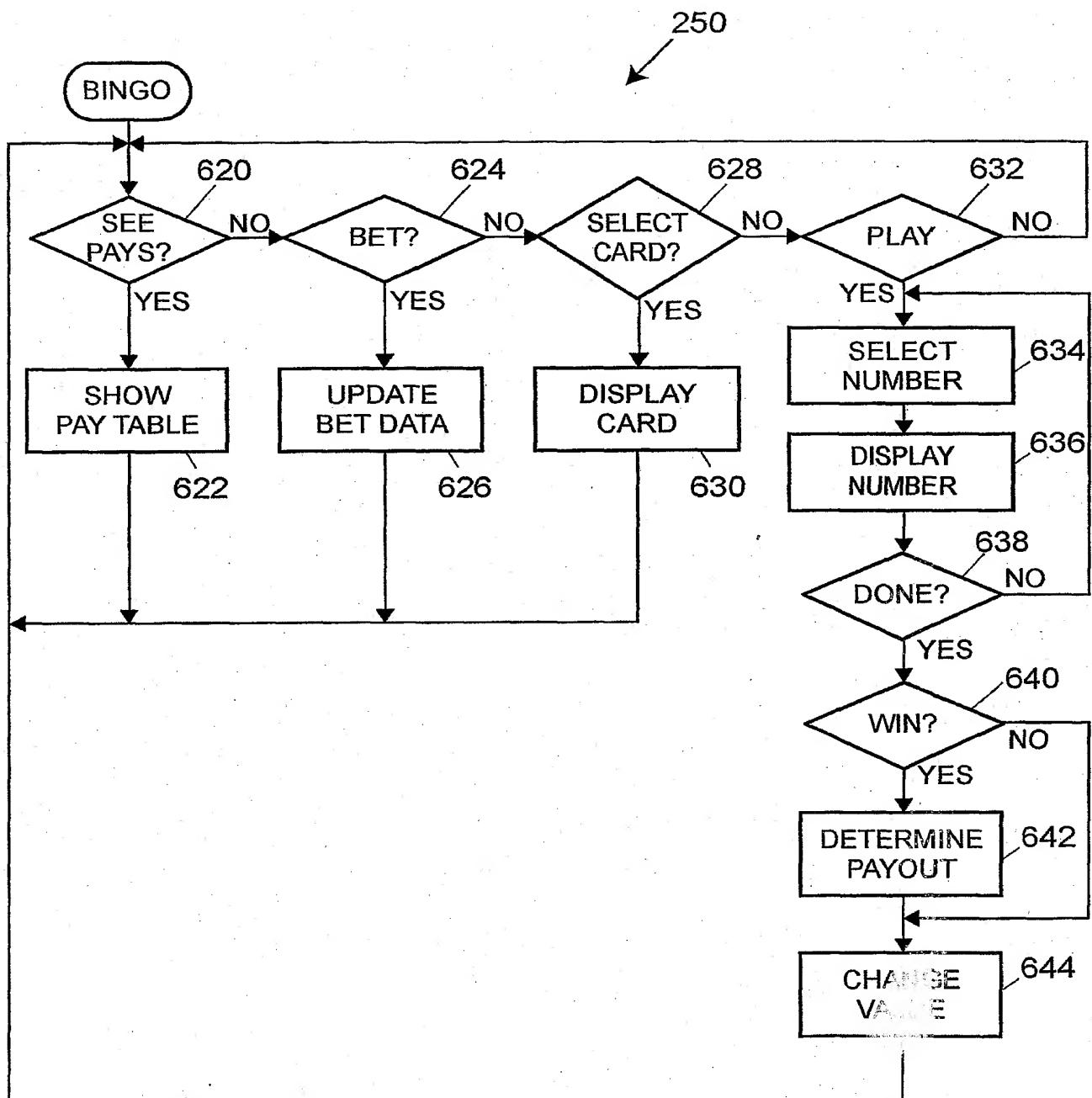


FIG. 15



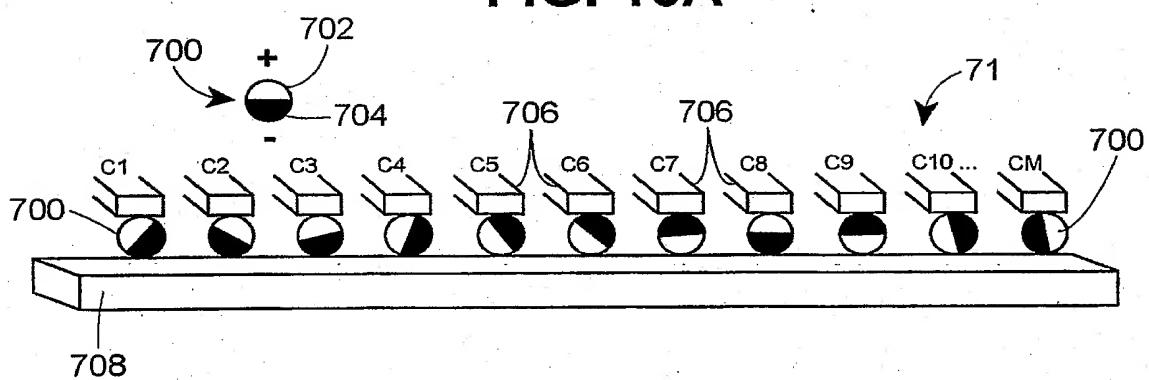
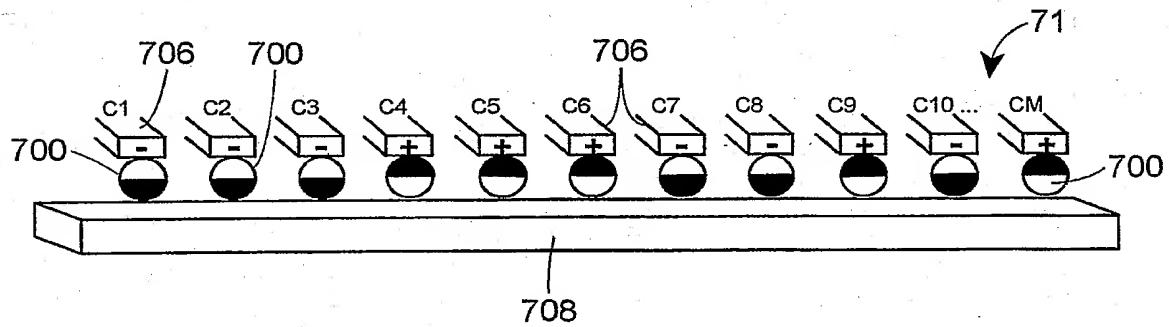
**FIG. 16A****FIG. 16B**

FIG. 17

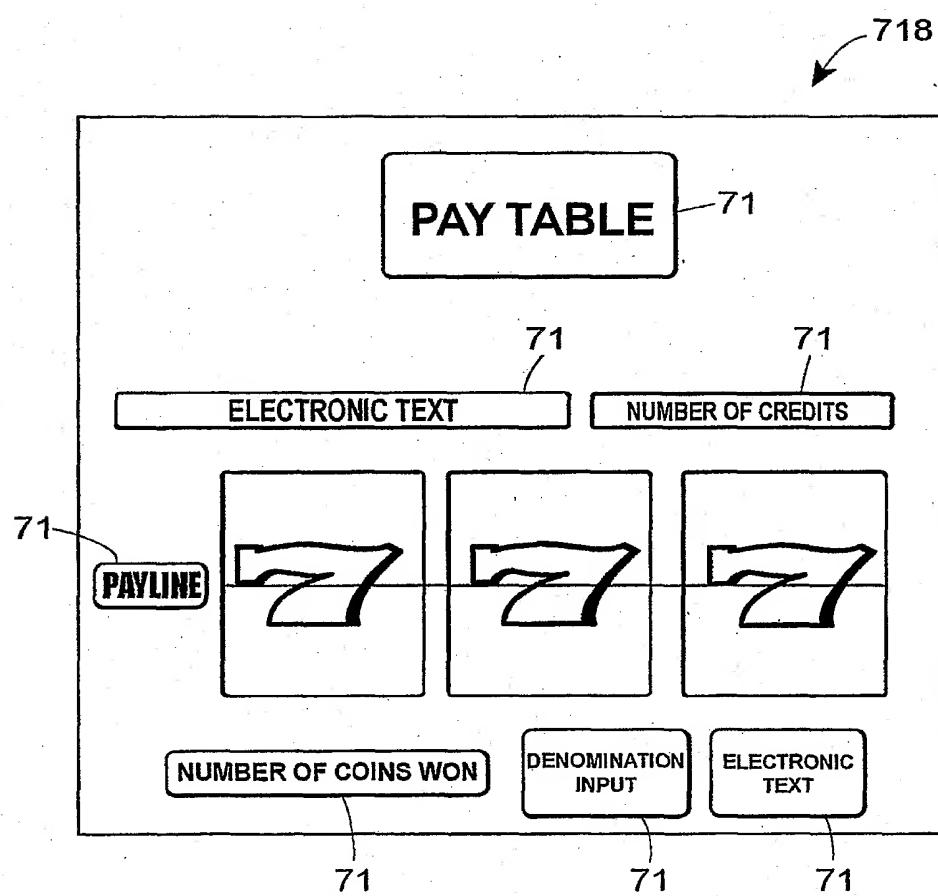
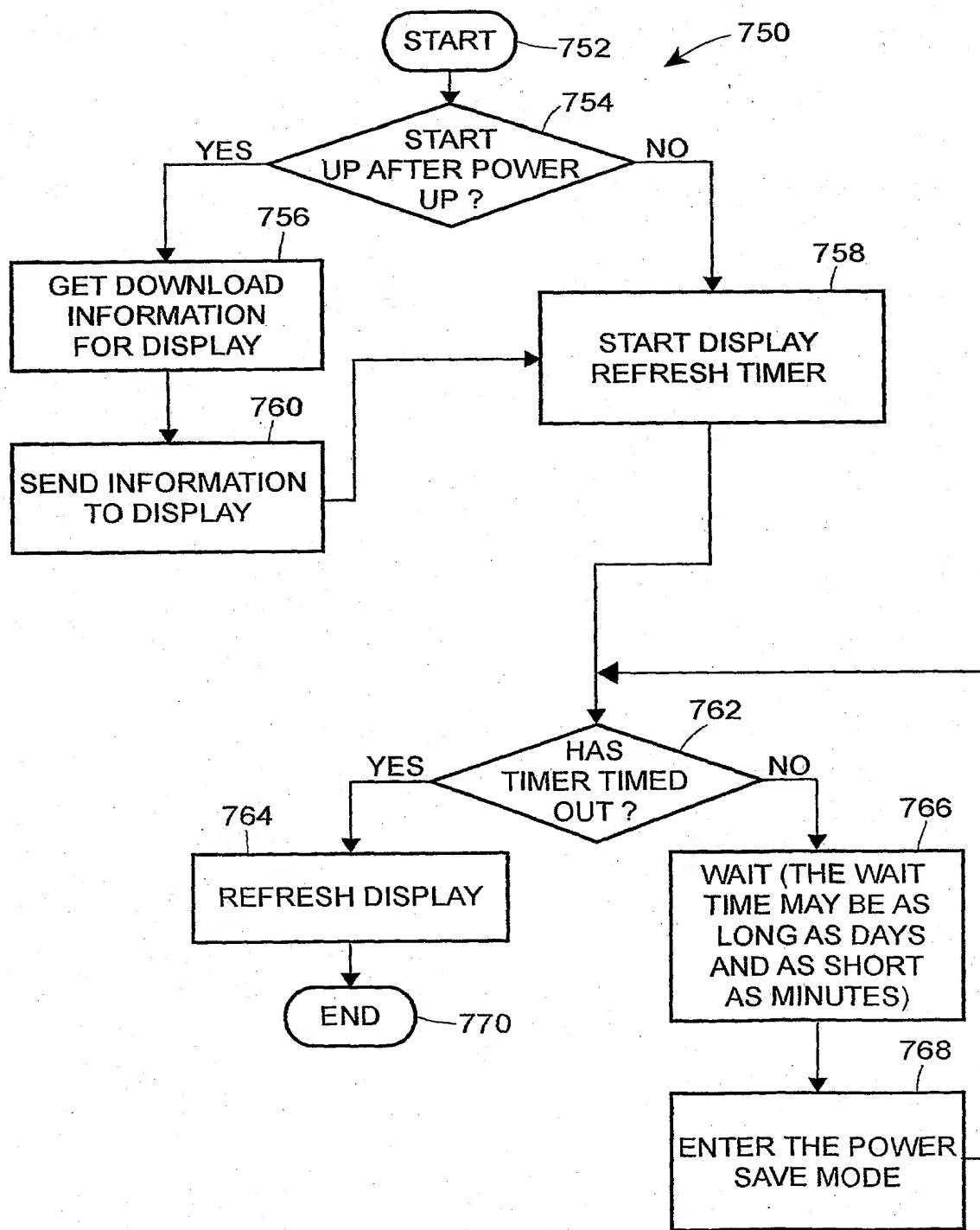


FIG. 18



# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US2005/017975

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 G07F17/32

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 G07F G09F G02B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 1 291 829 A (IGT) 12 March 2003 (2003-03-12) paragraph '0016! - paragraph '0025! paragraph '0031! - paragraph '0035!; claim 1	1-16, 19, 20
X	PATENT ABSTRACTS OF JAPAN vol. 2003, no. 12, 5 December 2003 (2003-12-05) & JP 2004 089689 A (SANYO PRODUCT CO LTD), 25 March 2004 (2004-03-25) abstract	17, 18, 22
Y		1-16, 19-21

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Date of the actual completion of the international search

9 September 2005

Date of mailing of the international search report

26/09/2005

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Lavin Liermo, J

## INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US2005/017975

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	BABAK KAVOSSI: "Printed microsystems on paper" HELSINKI UNIVERSITY OF TECHNOLOGY, 12 December 2001 (2001-12-12), XP002344235 finland Retrieved from the Internet: URL: <a href="http://www.tekes.fi/julkaisut/Active_imaging.pdf">http://www.tekes.fi/julkaisut/Active_imaging.pdf</a> > the whole document	1-22
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